

# The Iron Age

## A Review of the Hardware, Iron and Metal Trades.

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### Weston's Differential Pulley Blocks.

The Yale Lock Mfg. Company, of Stamford, Conn., who some two years ago purchased all the valuable patents relating to differential pulley blocks, and also the business and goodwill of the several parties who had previously been manufacturing them, and secured the services as engineer of Mr. Thomas A. Weston, the inventor, have recently brought out a new line of geared differential pulley blocks, specially adapted to the handling of heavy weights, a description of which is given below.

The differential pulley block is one of the most noticeable of the smaller mechanical inventions of the age. It met a want which had existed from the beginning of the mechanic arts. In nearly every mechanical operation, more or less handling of heavy weights is involved, and numberless contrivances have been devised for enabling such work to be done with ease, safety, and the employment of comparatively small power. The ordinary device in use all over the world is the common rope tackle and blocks, by the use of which the efficiency of a man, or his capacity to lift, is increased two, four or six fold, according to the number of sheaves in the blocks. This apparatus is of immense utility and is in universal use, but its multiplication of power is very limited, and its use necessitates provision against the "running down" of the loads suspended if the power be relaxed. The great value of the differential pulley block arises from the fact that in a block of even less compass than that of a rope tackle of corresponding capacity, multiplication of power from 30 to 300 fold is easily attainable, and its principle is such that the load suspended, no matter how heavy, can never run down or descend of itself, nor without the deliberate act of the operator.

The principle upon which the differential pulley block acts may be briefly explained as follows: The load is carried by an endless chain suspended from a double sheave or pulley at the top, and in turn supporting in its lower loop a single sheave or pulley to which the load is directly attached. The two sheaves or pulleys at the top are in reality formed of one piece of metal, and therefore revolve together, one of them being slightly smaller than the other. The two sides of the chain which pass around the lower sheave and thus carry the load, pass over different grooves in the top sheave—that is, one of them passes over the large groove of the top sheave while the other passes over the small one. It thus follows that when the top sheave is revolved in one direction the loaded part of the chain is being taken up on the large diameter, and given off (on the other side) on the small, so that the load is raised by the amount of difference between the length of chain taken up on the large pulley and the length given off on the small one. In like manner, when the pulley is revolved in the opposite direction, more chain is given off from the large pulley than is taken up on the small, and the load descends in proportion to the amount of this difference.

Since its invention by Mr. Weston, the direct differential pulley block has gone into most extensive use in all parts of the world, but its application is limited to the handling of weights of less than three tons, beyond which its size becomes too unwieldy and the power required to operate it too great to admit of its advantageous employment. The object of Mr. Weston's recent improvement is to extend the utility of the differential pulley block to the handling of weights of from 3 to 10 tons, or, if necessary, even greater ones. This has previously been done to a limited extent by the employment of large sprocket wheels and gearing, but only in such form as to be almost useless for practical purposes. Mr. Weston, however, has succeeded in combining with the regular differential block a system of gearing so compact and so powerful as to give all the desired increase in the efficiency of the block without practically increasing its bulk or weight. Indeed, as may be seen from the accompanying illustrations showing two 3-ton blocks, one of them of the direct or old style and the other of the new geared pattern, both drawn to the same scale, the bulk of the new block is even less than that of the old, while its weight is but very slightly greater. In the geared block, power is applied for hoisting or lowering by means of a hand chain, which passes on a third sheave on the upper block, and as this chain is in no way connected with the load, the operator may stand at quite a distance from the load if necessary, which is sometimes a matter of considerable convenience. With the plain or direct differential pulley blocks, 1000 lbs. is the maximum load which can be lifted by one man, while with the new pattern of geared blocks the efficiency of one man is increased so that he can lift from 2000 to 4000 lbs. This increased efficiency not only enables the blocks to be used for handling much heavier loads, but also makes the smaller sizes of the blocks available for use in places where the load to be lifted is more than can be conveniently handled by the number of men available for the purpose.

The Yale Lock Mfg. Company have recently erected a new building in connection with their works at Stamford, Conn., for the accommodation of that portion of their business, and announce their intention of giving special attention in this as in their other manufactures to the excellence, both in material and workmanship, of their goods.

### Bright Outlook in the Schuylkill Valley.

A correspondent of the *Philadelphia Press*, writing from Pottstown, says:

The iron business in the Schuylkill Valley has a bright outlook, and the people feel correspondingly happy. The stiffening up of prices has had a healthy effect upon the trade. The extensive works of the Pottstown Iron Company, which are located here, will be in full operation after the beginning of the new year. Their blast furnace, which was "blown in" several weeks ago, after being thoroughly overhauled, is doing well, the iron being of first-class quality. The company employ several hundred men, whose patronage among our business men amounts to considerable. The rolling mill of Potts Brothers is in constant operation. The present run has continued the greater portion of the past year. Week before last more iron

tion there now. At Phoenixville, 10 miles east of this place, the iron works are generally kept in steady operation. It will thus be seen that many localities are worse off than this in these hard times, and all thinking people here feel thankful that matters are so well with us.

William Lorenz, Esq., Chief Engineer of the Philadelphia and Reading Railroad, arrived at Phoenixville this morning, accompanied by several engineers of the new Brazilian Railroad. They came up in the Train, and paid a visit to the Phoenix Iron Company's works.

### Labor in the Rolling Mills and Mines.

The *Catasauqua Dispatch* gives the following summary of the report of Commissioner Walls, of the Ohio Labor Bureau, which contains facts and figures of interest both to workingmen and to capitalists. The reduc-

tion for such cases. This is one of the most persistent complaints of miners, who insist, in some cases, that they are defrauded out of a good share of their earnings by means of false returns from the scale. Another cause of bitter complaint is that in many localities where the operators sell nut coal at good prices, the miners are not allowed pay for anything but clean lump. There is certainly justice in their objections to this rule, inasmuch as the amount of nut coal taken from the mines averages from seven to 25 per cent, of the total amount mined, and is a practical reduction of wages to that extent.

Mr. Walls urges arbitration as one of the prime factors in the prevention of strikes, and recites numerous cases to prove that employers have been unwilling to submit to arbitration the differences between themselves and their employees, and this has led to serious trouble which might easily have been avoided if the capitalists had been

about 40 pounds of steam will be needed for ordinary work. An anti-friction roller or journal bearing, consisting of 14 little chilled iron rollers, and forming an endless chain, works around the journals of the driving wheels, avoiding friction and the necessity of oil. The car is started and gotten under headway by a coil spring starter, which works in a cylinder like the spring of a watch, and can at any time be stopped within its own length. Electric bells are provided within easy reach of each passenger, so that the car may be stopped without inconvenience or annoyance. These are a few only of the features of this invention. After a trial has been had, which will be within a week or two, we shall have something further to say.

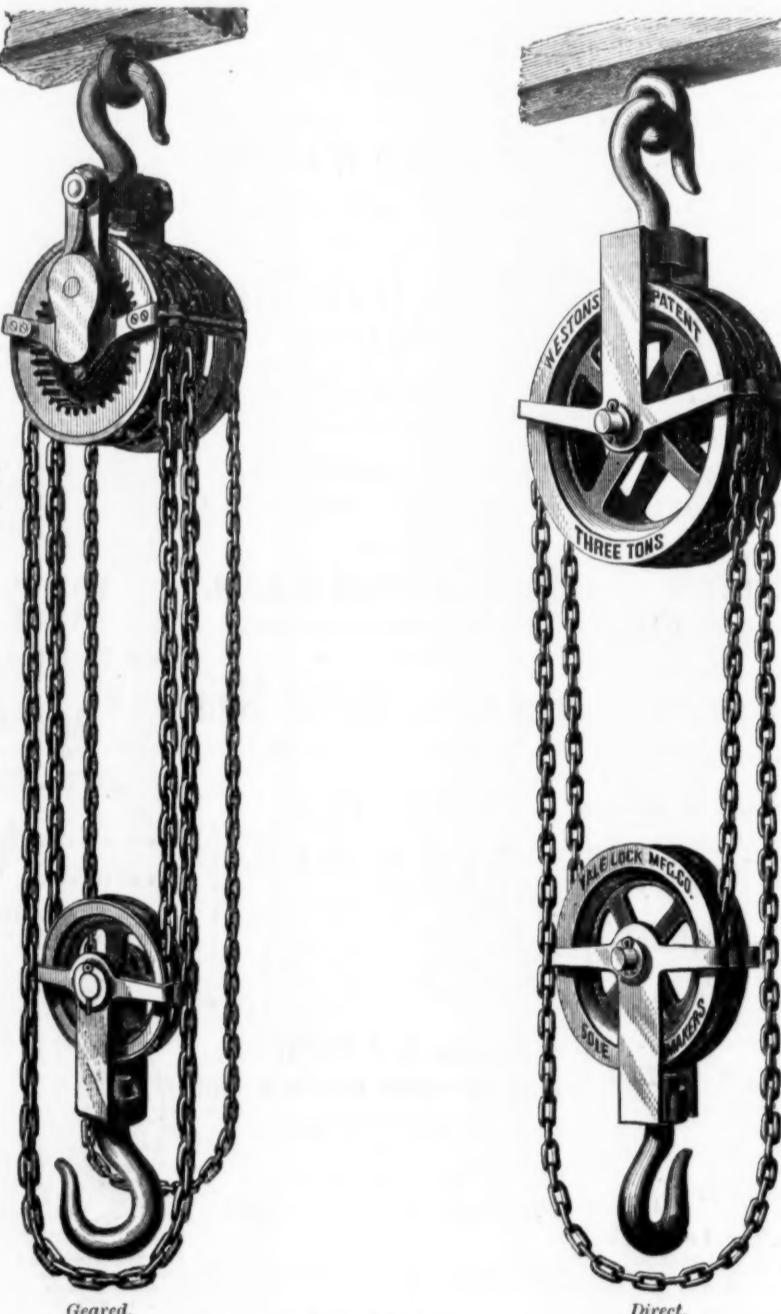
### Paraffine Oils and The Metals.

The *English Mechanic* says recent experiments serve to show that notwithstanding the absence of affinity between paraffine oil and other substances, it has a powerful action upon lead, and a slighter effect upon zinc and the other common metals. Upon lead in particular the action is so energetic that the illuminating quality of the oil is seriously impaired, and we have thus an explanation of the complaints frequently made. Dr. Stevenson Macadam read a paper recently before the North British branch of the Pharmaceutical Society, in which he gave an account of a series of experiments he had made upon the paraffine oils with the view of ascertaining their effects upon metals. His attention was directed to the subject by the behavior of a certain oil, presumably of good quality, which burned imperfectly in several different lamps. An examination led to the discovery that the oil was so largely contaminated by lead as to produce a choking of the wick. In a single night the wick of a lamp had to be changed several times, and on examination after charging these wicks, showed a fine network of lead. If the wicks were left unchanged, the choking became so extreme that the light was practically extinguished. It appears that the oil in question had been stored in a lead-lined tank, and in his experiments Dr. Macadam used scraped lead and also tarnished lead in pieces. He found that even when the paraffine oil was pure and perfectly rectified it had a powerful action upon lead, quickly dissolving enough to materially lessen its illuminating power. Various qualities of oil were tried, but all exhibited a similar action upon lead, but upon tin the effect was so slight, that even after a month's storing, the quantity of the metal dissolved was so small that it was not sufficient to impede combustion. With copper and iron the action was also slight, but the effect upon zinc and upon galvanized iron was so great as to proscribe the use of zinc or galvanized tanks for the storage of mineral oils. Tinned copper and tinned iron have little if any effect upon the oil as an illuminating agent, but solder is acted upon by the oil.

These facts indicate clearly what metals should not be employed as the lining material for tanks or other vessels used in the storage of the mineral oils. In another series of experiments made to test the action of different samples of paraffine oil upon lead, it was found that their power of absorbing had differed materially, and that such difference in the degree of action was not traceable to impurities in the oils, but was probably due to the varying proportions of hydrogen and carbon present. Dr. Macadam suggests that, if possible, cisterns and vessels in which paraffine oil is stored should be lined with enamel, and it follows from what has been said that lamps made of metal should have porcelain cisterns, or those portions containing the oil should be constructed of copper or brass, as although tinned iron would answer, the action of the oil upon the solder will speedily destroy them.

A new use has been found for the telephone. Since it was introduced into several mines for the purpose of communication between the men at work below the surface and the offices of the companies above ground, it has occurred to somebody connected with one of the mines that it could be used to advantage in indicating the ventilation of the mines themselves. The circulation of air in the mines is shown by the anemometer which is situated below. The miners have fallen into the way of being careless as to the ventilation. But now it has been found possible, by attaching the telephone to the anemometer below, to indicate the flow of air in the mine in the office of the company above. It is proposed shortly to try experiments to see whether the telephone can be made available in divers' operations. It is believed that the instrument may be attached to the armor of divers, and be made a perfect means of communication between them and their assistants.

Advices from Warsaw state that three 30-ton guns have passed through there from Germany to the seat of war in Bulgaria. Ten more are shortly expected to complete the contract concluded between Messrs. Krupp and the Russian government. The cost of each gun is £3,500, a further sum of £200 being allowed for freight and other expenses in transporting the cannon from Essen to Warsaw. The caliber of the guns is 13 inches.



IMPROVED DIFFERENTIAL PULLEY BLOCKS.

was made by this firm than in any previous week. The Warwick Iron Company, composed of Philadelphia and Pottstown stockholders, have one of the finest anthracite furnaces in this State at the western limit of this borough. Unfortunately, however, it chilled upon four previous occasions, being put into blast last night for the fifth time. Various reasons have been given as to the cause of the troubles of the furnace, but as even founders cannot agree upon any one theory, an outsider will not attempt to give any satisfactory explanation. The company has extensive mines at Boyertown, seven miles distant by rail, and can procure their other material at reduced prices. The Glasgow Iron Company have their mills one mile northwest of the town. They are run by water, supplied by Manatawny Creek, an inexhaustible stream, and are in continuous operation. Pine Iron Works, four miles northwest, owned by Messrs. Bailey & Shoemaker, who are the heaviest stockholders in the Glasgow Iron Company, do a regular and well-paying business. They likewise have water power, Manatawny Creek being the source. The Keystone Tack Company, a recently organized enterprising firm of practical business men, have a fine trade in their line. The residents of Douglassville, the next village west of Pottstown along the Reading Railroad, feel highly gratified at their prospects for iron works, a forge of large dimensions being in process of erec-

tion of wages in the rolling mills since 1872 is from 10 to 50 per cent. Mr. Walls, after speaking of the severity of the work in rolling mills, says that there is not a mill reported as having any place where the men can keep a change of clothing so that they will not be forced to walk home in their working clothes, saturated as they are with perspiration, and that if the men are not frequently ill it is due solely to their good constitutions rather than to the forethought of their employers. Many of the mill employees are reported as owning their own homes, which is certainly the best test of their frugality and temperance.

From a table giving the earnings, discounts and net earnings of 84 miners for six months, commencing January 1 and ending June 30, 1877, representing 16 counties and one-third of the mines in actual operation, it is conclusively shown that the average earnings for those 84 men was but \$134.81, or a monthly average per man of \$22.74, or a weekly average of \$5.18. There is a law in existence allowing miners to appoint and pay a check weighman at every mine to see that the operators deal fairly with them, and yet, singularly enough, while there are 300 mines there are but three check weighmen. In some cases the miners do not want these weighmen, and in others the operators disobey the law by refusing to allow them about the scales. This would be all changed if the law was so amended as to provide a penalty

willing to meet their employees half way. He holds that the time when the word or dictation of an individual or corporation can, for any fixed period, fix the wages of their men has forever passed away, and that any such arbitrary attempt must, sooner or later, be resisted, and adds: "And it should be resisted, no matter what the resistance may cost."

**New Steam Street Car.**—A new patent steam street car is being built at the shops of Messrs. J. G. & M. C. Blaine, Columbus, Ohio, which is, in many respects, a novel invention. The patentee is Dr. R. R. Carpenter, a gentleman who has given the subject much study. The *Railway Age* says:

"The front end of the car, which is not essentially different from other street cars, rests on the truck of the cab of the little engine, avoiding the use of more than two wheels, preventing the shaking peculiar to ordinary street cars, the weight being carried instead of hauled. The cab is built over the boiler, effectively hiding it, and there will be no smoke, no exhaust steam, no noise to frighten horses. A speed of six to ten miles an hour can be made if desired. The weight of the car and engine will be a little less than two gross tons, and their cost complete about \$1500. A coil of pipe (150 feet) is placed under the car, through which steam passes from the engine and back under the boiler and out at the smoke-stack. Only

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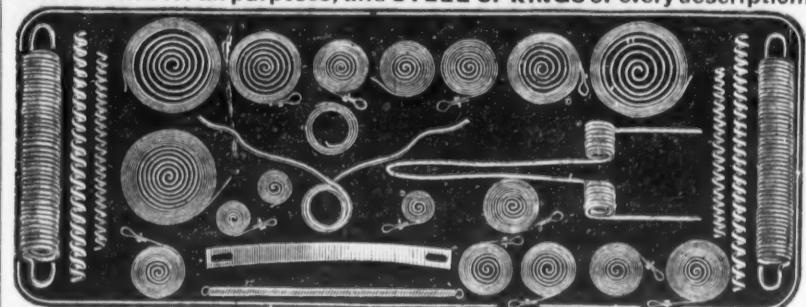
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**Leggett's Patent Variable Hose Nozzle.**

The accompanying illustration shows a very important improvement in hose nozzles by which the size of the stream may be varied to suit circumstances. In throwing water from a hose the size of the stream is of great importance, and, as the conditions of distance, quantity, &c., vary, it is necessary that the opening through which the stream is delivered should vary in size. It is at the same time very desirable, in fact essential, that the openings should be perfectly circular in section. Heretofore the means of adapting round and practical nozzles to different distances was to unscrew and exchange. During this operation the engine must be stopped, property and perhaps life sacrificed by the delay, and the continued flow of water due to the contraction of the hose was certain to spurt most disagreeably in the faces of the operators. When completed the size might still be wrong. For fear of having too little force to reach the desired point, the prudent firemen always used one somewhat smaller than was really necessary, and thus imposed increased labor upon the engine or men.

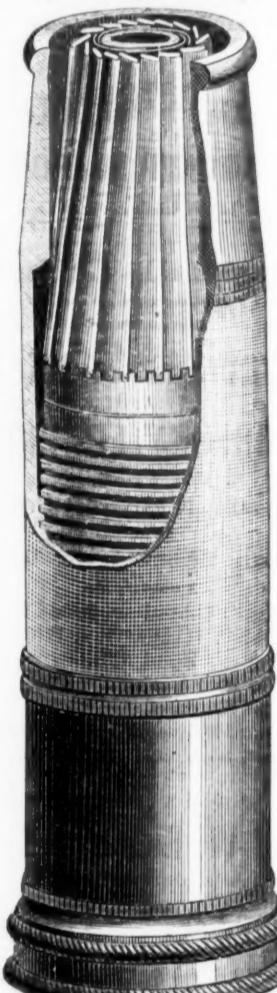
The nozzle which we illustrate is the invention of Captain William Leggett, of Middlebury, N. Y. The nozzle is especially designed to serve in connection with the delivery hose of fire engines, delivering a smooth, round stream under all conditions of small or large opening, and high or low pressure. In the cut, part of the exterior shell is broken away to show the construction. It will be seen that a cone is used formed of a series of staves somewhat like those of a barrel, each one of them, however, being made so wide as to overlap somewhat upon its neighbor. These are hinged at the inner end in such a way that the upper ends may swing in or out from the center. By screwing the outer part of the

hose. Running to a fire, a hose company hastily gets a hydrant stream on through a large-sized nozzle; all would go well were they left alone; but presently they find four, five, or six streams playing around them, and they then notice that their stream is losing its power. This is easily explained, for the head pressure being taken by the other lines, the water they are getting does not fill their nozzle; the impulse is to change the nozzle to a smaller one, but, considering the time and labor required to do this, they are apt to leave the nozzle as it is, notwithstanding they are working at a great disadvantage. The "Variable Nozzle" having a clear water-way, keeps a perfectly round, smooth stream under all conditions, and the adjustments are made readily under any pressure.

**Manufacture of Asphaltum.**

The essential property of the asphalt made according to the invention of E. Rocheman, Cairo, Egypt, is its power of entirely resisting solar heat without experiencing any depression in consequence of the softening of the material under the solar influence. Trials have also shown that it resists the action of cold and that it does not experience under the influence of frost any contractions resulting in fissures in the mass. It is to give the asphalt this property of resisting solar rays that Mr. Roche proposes to take as the base of his manufacture a particular clay called in geology fossil clay, and which is found in abundance in the old alluvial earths of Egypt. This clay is, therefore, the chief feature in his manufacture; it is to it the stability of his products is due, and also the hardness which they offer to the trampling of men and animals as well as to the friction of vehicles; but in the manufacture of this asphalt, clays of another kind, possessing of themselves the qualities of the fossil clays which are found in Egypt, or which are brought by different means to that state, are capable of producing the same results.

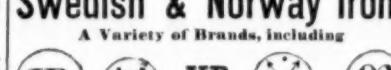
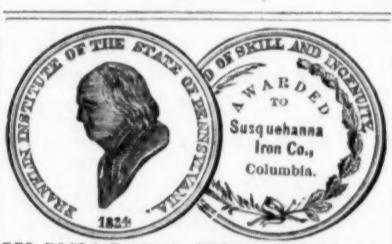
In the process of manufacture the first operation consists in carefully grinding the clay either by hand or by suitable machinery until it is reduced to a state of impalpable powder, in sifting it in order to remove foreign matters which may have got mixed with it, and in again reducing it. In this state it is necessary to be assured that it is as dry as possible, and if it is not in this essential condition, the drying must be effected by any suitable processes which are prompt and economical; the clay is then ready for manufacture. As to substitutes for the Egyptian clay, he avoids especially saliferous clays, but for the most part, under the conditions hereinbefore explained, clays of all kinds can be advantageously employed when they are purified and carefully dried. Clays, he says, are, in a chemical point of view, hydrated or hydratified aluminous silicates, sometimes mixed more or less with pure quartz sand, on account of their origin, which connects them with the destruction of different kinds of rocks. These clays purified will quite answer the purpose. It follows, then, from this essential consideration, that the more or less fine, or the more or less pure clays generally employed in the manufacture of bricks, and of fine or coarse pottery, pipes, crockery and porcelain are excellent materials for the manufacture of the asphalt; also all *débris* of bricks, pottery, crockery and porcelain, broken and pulverized. All these materials, the base of which is clay, have the property of absorbing bituminous matters, and of forming therewith compact and resisting mixtures, having properties that produce asphalts of very good quality and capable of being applied for various purposes.

**Decision Important to Travelers.**

The Philadelphia *Ledger* gives the following particulars of a case recently decided, which is of some interest to the traveling public:

A suit against the Pennsylvania Railroad Company, which has been in the courts for 15 years, was decided by Judge Donohue, of New York, on Monday. According to reports of the case in the New York papers, in 1862 Mr. Cyrus H. McCormick went with his family to the Pennsylvania Railroad depot, and asked to have his baggage checked to Chicago. The rules of the company declared that the baggage could not be checked until the owner had exhibited his ticket to the baggage master, and Mr. McCormick, in compliance with the regulation, went to purchase his ticket. When he returned the baggage master demanded extra payment, on the ground of excess of freight. Mr. McCormick refused to pay the extra amount, and demanded the return of his baggage, but the baggage master said that the baggage had been put on the train, and there was not time to remove it before the starting of the train. Mr. McCormick then determined to remain over in this city until the next day, and the president of the company gave him an order, which he telegraphed to Pittsburgh, to have the baggage stopped there. The telegram was sent, but the baggage was nevertheless carried on to Chicago, and was, the next night, destroyed by fire. Thereupon suit was brought for the recovery of damages. The case was tried in New York, went to the Court of Appeals and was sent back for retrial. On Monday Judge Donohue signed findings of law and fact awarding Mr. McCormick \$7193 damages and \$7934 interest for 15 years—total, \$15,127. Judge Donohue decided that the company was liable for the acts of the baggage master, because it had taken the plaintiff's property without his consent, as well as against its own rules, at a time when the plaintiff was observing those rules; the company by its own wrongful act made it impossible to restore the property, and the receiving by Mr. McCormick of Mr. Thompson's order did not constitute a waiver of his right to hold the company for the conversion of his baggage. The case is not only a singular one in the incidents which raised the dispute, but is interesting because the decision shows the importance of a strict observation of the rules adopted in the transaction of business.

This operation of changing consumes precious time, as the tip is generally required to be changed at a critical moment. The constant changing of nozzles, though very necessary to be done, is seldom done, for the reason that the time and labor required in the operation are not compensated for in any manner. Using a Leggett nozzle, which you will understand, throws water just as a plain nozzle does, you can adjust the stream to any size or force you require. The pipeman, by simply turning a portion of the nozzle with his right hand, expands or contracts the orifice, thus always throwing a stream to suit the circumstances, be the fire high or low, far or near. Suppose the pipeman is playing through a large nozzle, when suddenly he notices that his water pressure is failing, he can, by using the "Variable Nozzle," reduce in an instant the tip, thus adding at once greater force to

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## The New Iron District of Ohio.

To the Editor of The Iron Age: In your issue of the 3d inst. you copy from the correspondence of the Engineering Journal some most glaring misstatements as to the new iron district of Ohio. The value of the statements of a writer who locates the Gore Furnace at Shawnee, when in fact it is several miles distant on another line of railroad, will be properly estimated here, and is about as near the facts as that the district is "under a cloud," or that the X X Company had "drifted" for the Iron Point ore on their property.

In addition to other want of information, the writer seems to have heard of but two ore seams in the district. Those mentioned have a vertical separation of 150 feet, with several intervening, the "Baird," the equivalent of the limestone ore of Hanging Rock, being 35 to 40 feet below the great coal seam, while the Iron Point ore is 110 to 115 above the coal. The latter lies so high in the series that in parts of the field the hills have not sufficient altitude to carry this seam, which is geologically the representative of the blackband of Tuscarawas county. This ore has been found at various points over a wide range, from near New Lexington, Perry county, to hills south of Nelsonville, Athens county, and is opened and mined at the new Moxahala Furnace, where it is in fine development and quality. The writer of the correspondence referred to doubts the durability of the supply of this ore in the vicinity of Shawnee. The Licking Iron Company, operating two furnaces (Fannie No. 1 and No. 2), recently purchased 100 acres of land near Iron Point. Borings on 60 acres show an average of over two feet of this ore, or, as is estimated by the purchasers, the 60 acres contain 500,000 tons. The Ogden and Akron furnaces, near Bessemer, 9 miles south of Shawnee, get their ore supply from an intervening seam 80 feet above the "great" coal seam. This seam is opened over a large extent of territory, and has a thickness of 2 to 5 feet, and is variously estimated to yield, raw, 25 to 40 per cent. The seam lies well up in the hill, 15 feet above the limestone, exposing an extensive outcrop, and giving opportunities for mining by stripping to an unusual extent. The first furnace in the district went into blast in November, 1875; there are now nine in successful and profitable blast. Three others will be blown in the present month, and another early in the spring. Many more are in contemplation, and present indications are that the coming season will be the most active in the development of this industry yet experienced.

When the character of the industries and their wonderfully rapid development are considered, it will not be regarded as singular that some mistakes have been made. The temporary stopping of the X X Furnace mentioned by the correspondent was occasioned by the inadequate water supply, which has been easily and permanently remedied, and the experience of their first season, one of unusual drought, has not been of a very expensive character, while the statement that the X X and Gore were "burnt out" will certainly be in the nature of news to their owners.

During the past week, in company with Prof. Orton, of the State Geological Survey, the writer spent some days at the Akron Furnace and vicinity.

This furnace has been in blast about six weeks, and is gradually and regularly increasing its product each week. They are now making about 24 tons per day, using, in addition to the native ore, about 12 per cent. Lake Superior hematite, which costs, at the furnaces, \$5.50 per ton. Native ore (before roasting) cost 85 cents; coal, 70 cents; limestone, 80 cents. All these are in the immediate vicinity of the furnace, and lie above drainages, being mined either by stripping or drifting. Mr. Buchtel, manager of the Akron, stated that he was producing iron for something less than \$12 per ton, and would be able yet to considerably reduce the labor account. Most of the iron made is worked up at the company's mill at Akron. Some of the first made (not suitable for their own use) sold at the furnace for \$18 per ton.

The Akron Furnace is admirably located and possesses some marked advantages in this respect and cost of material, but none that cannot be duplicated in the locality. The iron of this district has an extended market in the West and Northwest, and is also largely used in stove manufacture in the East. Four of the furnaces use a small per cent. of lake ores, the others using only native. Two railroads give access to lake ports and furnish the means of economically introducing the lake ores when desirable to use them in connection with the native material. In conclusion, I feel warranted in stating that in no other known district are all the elements necessary to produce cheap iron found in such profusion and under conditions so favorable for economical mining and delivery at the furnaces, and most fully concur in the conclusion of one of our experienced iron masters and a well-known representative of the Western iron trade who recently made his first examination of the district, that "iron can be more cheaply produced there than elsewhere in America."

I. B. R.

Newark, Ohio, Jan. 7th, 1878.

Mechanics' Technical School.—Mr. John Scott, of Oakland, Cal., has agreed to contribute \$20,000 for the establishment of an institution for the education of boys in that city, to be known as the Mechanics' Technical School. It is the design of the Institute to put the boys in a course of a-technical work with the machinery, tools and appliances used in various mechanical trades, and when a factory or foundry sends an order for a boy or young man to perform a certain line of work, the Institute will fill the order. The *Ledger* says it is believed that the Institute, in this way, will be able to graduate young and competent mechanics to take the places of those who will be compelled to retire on account of age.

The building is to be 125 feet front and 145 feet deep, and will contain 8 class rooms. The style of architecture is modern English Gothic. The edifice is to be full two stories high—the height from the ground to the ridge 55 feet, and from the ground to

the terminal of the tower 120 feet. The apartments will consist of an apparatus room, printing and engraving room, engineer and machinist model room, architects' model and class room, telegraph department, and library, office and lecture rooms. The material of the building will be wood on brick foundation, and the cost of the structure will approximate \$30,000. The rooms will be ample to accommodate 400 pupils. Public-spirited citizens of Oakland will be called upon to contribute money to carry forward the enterprise. The State of California will also be asked to appropriate a sum of money to assist in the execution of the scheme.

## The Hot-Blast of the Lucy Furnace.

To the Editor of The Iron Age.—DEAR Sir: In notice in your paper of the 20th ult. your remarks on an article which appeared in the Sharon (Pa.) *Herald*, comparing the work of the Stuart and the Lucy furnaces, in which remarks I most heartily concur. Allow me to say that when I induced the owners of the Lucy Furnace to agree to allow me to build her of the plans and dimensions she is, I never contended, or represented, that her make would be increased in the ratio of her cubic capacity over the furnaces then in use in the Pittsburgh district.

I did distinctly state, however, to Mr. A. Carnegie that she would make her iron more economically.

I wish to call your attention to a statement in your remarks which might lead to a misapprehension. You state that the Lucy has "an ordinary U pipe hot-blast." This might be understood to be of the old-fashioned type, which I find in general use all over this country. Allow me to say that the hot-blast pipe was designed by me, from my recollection of one introduced by John Gjers, of Middlesborough, England, shortly previous to my departure, although I changed the arrangement of the pipes of the stove to overcome some, as I considered, objectionable points, and I am well satisfied that it is the best cast-iron hot-blast stove I have ever seen for heat and longevity of pipes, and in this case they have never required any repairs since they were first erected at the Lucy.

I remain, yours, &c., W. M. TAIT.  
Wheeling, W. Va., Dec. 29th.

## Keeley's Rival, the Bradley Promethor.

A reporter of the Baltimore *Bulletin* examined the yacht driven by the Bradley Promethor before it was taken to Baltimore, and has this to say about it:

It is capable of generating from one to a thousand pounds of pressure to the square inch in a minute. It has not the slightest connection with the steam-power so extensively in present use. The *modus operandi* of the apparatus is a *fac simile* of the human lungs. It is based on physiological principles, and is constructed on the cellular system.

The actual motive power is a certain kind of gas, which is developed by mechanical disintegration, the water being forced through solid silver by hydrostatic pressure, which is automatic, and is operated by the engine. This product is introduced into small cells of one inch interior diameter, made of the best decarbonized steel, and there quickened into gas by heat, which does not need to be over the ordinary temperature to produce steam. There is no water introduced as water into the generators.

The apparatus, therefore, contains nothing but pure gas, without any likeness to a steam boiler. Three hundred pounds pressure can be had from a thumbble of water, and the pressure can be raised any degree to thousands of pounds to the square inch by regulating the supply of water. The gas reaches so intense a state as to show great signs of electrical action, but before being admitted to the cylinder of the engine it is oxidized, which finally prepares it to act with all the smoothness of steam on the piston.

The reporter was shown by Mr. Bradley a 20-horse power generator on board of a yacht 35 feet long, which was lying at Cambridge wharf. A successful trip was made from Medford's to Cambridge, on the Choptank river, in one hour and a half, with several stoppages. The quantity of water consumed was about 20 gallons. The generator the reporter saw is composed of a series of 560 cells, one inch diameter on the interior and two inches on the exterior, the whole occupying a space of only 22 square inches. The first step in the motive power begins with the explosion of the water into small particles which can no more explode a second time than powder once ignited.

A boat running a given distance can be kept at a uniform pressure, and no boiler will work with greater regularity than this gas regenerator.

Mr. Bradley says that his invention is not the result of a dream or chance, but of hard search and study, based upon scientific principles, and is the outgrowth of eight years of unremitting labor and investment. The motor has now been in successful operation (in private) for two years, and has been pronounced a complete success by some of the best engineers of the country, who have been shown the working of the wonderful little piece of machinery.

It is entirely a new system of engineering—not the creation of a new power, but the development and the concentration of power of a great element. The motor has already been patented in Canada, throughout Europe, South America and Australia.

The little yacht was to have left Cambridge last night, continuing her trip for Baltimore, and it is expected to reach this city, after making one or two stops, this afternoon.

Robert D. Bradley, the inventor of this promethor, is but 38 years of age, and a native of Caroline county, his present residence being at Preston, in the aforesaid county. He is a local preacher, and formerly edited the *Vienna* (Dorchester county) *Clipper*.

The editor of the *Public Ledger*, in commenting upon this, says: "It will be remembered that after the yacht reached Baltimore it was refused clearance papers because it was without inspection certificates, and the inspectors of steamboats could not make up their minds whether or not it was

driven by steam power, and so refused the certificate."

We shall watch the progress of Mr. Keeley's new rival with great interest.

## Hydraulics in Warfare.

At a recent trial of the 25-ton barbette guns of the British war ship *Téméraire*, four rounds were fired against time from the after gun for the purpose of testing the rapidity with which the gun could be loaded, laid and discharged, and also of proving the stability of the hydraulic gear. From fire to fire the times were 2 minutes, 1 1/2 minute, and 1 1/2 minute, the four rounds being fired in 5 minutes and 25 seconds, including 20 seconds for a miss fire. The above times, short as they are, afford no conclusive test of what the mechanism is capable of accomplishing in the way of rapidity. The gun was worked entirely by seamen gunners, no other person, save a lieutenant, being allowed within the turret while the fire was in progress. No. 1 laid and fired the gun electrically, two men attended to the elevating gear, one man took charge of the levers for lifting the gun and rotating the platform, and a fifth managed the rammer and shot-hoist. These composed the whole of the gun company. They had had a little experience of the new drill, and with a more familiar acquaintance with the machinery, greater rapidity of practice will result.

With skill, two movements—turning and raising—can be made to occur simultaneously, the same as with a hydraulic crane; and, as the gun can be laid while it is being loaded, the number of rounds that can be discharged within a given time may be greatly increased. It must, however, be remembered that mere rapidity of fire is not what is wanted with guns of high natures. Considering the weight of the projectiles which they throw, accuracy is everything, a few good hits being probably all that will be required to disable an enemy. Eleven rounds were subsequently fired from the forward barbette gun, and in this case, in consequence of the inferior training of the men, the practice was not so good. Seven rounds were first fired at the target deliberately, and the concluding four rounds were fired for rapidity, the times being 1 minute 23 seconds, 2 minutes 47 seconds, and 1 minute 36 seconds, the whole occupying 10 minutes, including 20 seconds for a hitch in connection with the rammer. Although the recoil of the gun amounts to 60 foot tons, this enormous force was so completely absorbed by the springs and water presses that the recoil upon the cylinders did not exceed an average of 12 inches. After the trials of the barbette guns had finished, the broadside batteries, which consist of two 25-ton guns and four 18-ton guns, were fired separately, and also simultaneously, by electricity from the conning tower. The firing was

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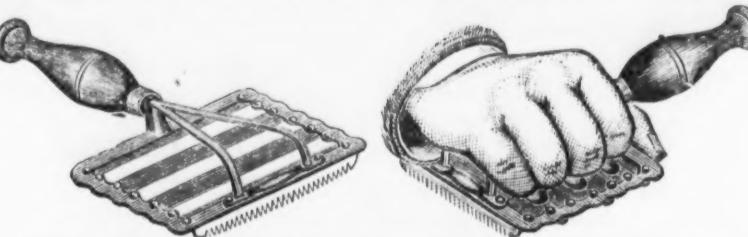
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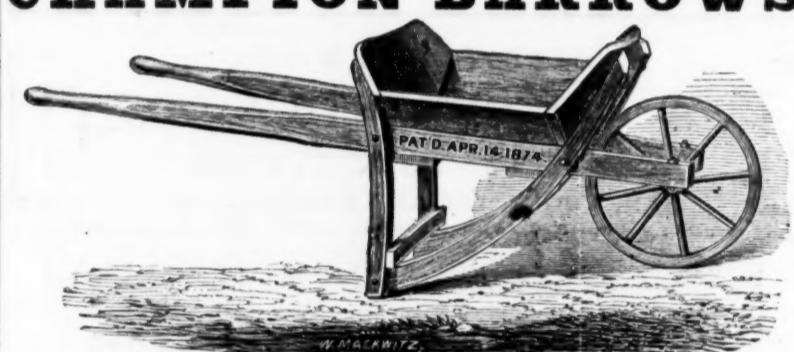
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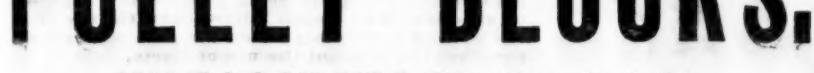
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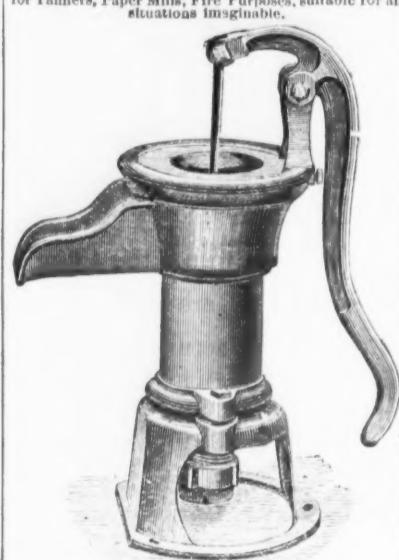
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They can be immediately changed from lift to force pumps, and the air chamber can be pivoted so as to be made to work at any desired angle with the spout. Having close tops, they cannot be compared with our new elegant pattern Deep Well Non-Freezing Fire Pump.

Also, Pumping and Vacuum Chambers—a complete protection against sand or gritty water in dug or driven wells, and rivers. For hand or steam pumps, all sizes, from 1/4 inch to 4 inch suction pipe.

Send for Catalogue.

NASON MFG. CO.,

71 Fulton and 71 Beckman

St., New York.

West Coast Agency—Newton

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Pacific Coast Agency—Dunham, Carrigan &amp; Co., San

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AGATE IRON-WARE

PATENTED

May 30th, 1876. Feb. 27th, 1877. July 3d, 1877.

ABSOLUTE SAFETY  
(M&C) GUARANTEEDABSOLUTE SAFETY  
(M&C) GUARANTEEDFOR SALE  
EVERYWHEREFOR SALE  
EVERYWHERE



# USE THE BEST.

NEW



AMERICAN FILE COMPANY.

THE NEW AMERICAN FILE COMPANY have the exclusive right to use the Bernot process for cutting Files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing Files and Steel.

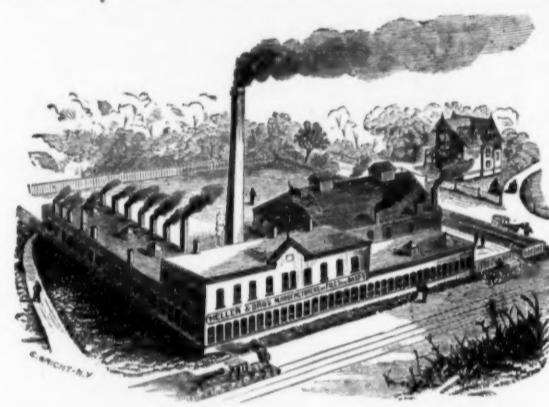
NEW AMERICAN FILE CO., Pawtucket, R. I.

**AUBURN FILE WORKS,**  
Superior Hand-Cut  
**FILES AND RASPS,**  
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.  
**FULLER BROS., Sole Agents,**  
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**C. T. DRAPER & CO.**  
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Manufacturers of SUPERIOR  
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**FILES and RASPS**  
Made from Best  
ENGLISH CAST STEEL.  
Quality guaranteed by written warranty  
when required.



**Heller & Bros.,**  
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Manufacturers of  
Best American Hand  
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Guaranteed to give entire satisfaction.

For sale by all leading Hardware and Iron houses.

VOLUME IV  
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**The House Furnisher**  
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12 Murray St. & 15 Park Place.  
Will contain more than 60 pages of  
ORIGINAL MATTER,  
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Fancy Brass Goods and Small Iron Castings  
TO ORDER.

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MANUFACTURERS OF

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SHADE FIXTURES, NOTIONS,  
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Factory, Wolcottville, Conn.

Store, 81 Reade & 97 Chambers Streets, New York.



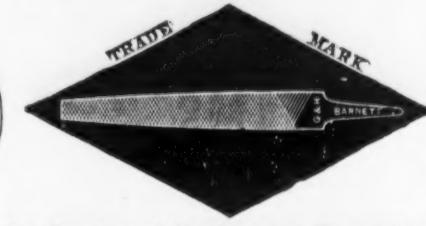
The "Family" Egg Beater.



Smith's Patent Nutmeg Grater.



# Black Diamond File Works.



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"VERY SUPERIOR GOODS."

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NO CONNECTION WITH ANY OTHER HOUSE.

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AGENTS for the American Screw Co.'s Machine Screws and Taps.  
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**CHARLES B. PAUL,**  
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Warranted CAST STEEL.  
187 Tenth Street, Williamsburg, New York.  
Established 1863.

**THRIFT FILE WORKS.**

Warranted Exclusively Hand-Cut.



Every File  
Warranted.

R. H. HOWARD & CO., Nos. 428 & 430 Ireland St., Phila.

**AUSABLE HORSE NAILS**  
POLISHED OR BLUED.  
HAMMERED AND FINISHED



**The Ausable Nails**

Are Hammered Hot,  
And the Finishing and Pointing are  
Done Cold,

Thus Imitating the Process of Making Nails by Hand.

Quality is Fully Guaranteed.

For Sale by all Leading Iron and Hardware Houses.

**ABRAHAM BUSSING,** Secretary,  
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**HOCEN ELBOW COMP'Y,**

MANUFACTURERS OF PATENT STAMPED

**Stove Pipe Elbows.**

The Hogen Elbow has no CRIMPS, CAVITIES or ANGLES, which cause accumulations that rust or corrode the iron; it is also easily polished and kept clean, its surface being smooth and regular on all sides. The Hogen Elbow forms the arc of a circle, and invariably holds the pipe securely at right angles, without the use of rivets.

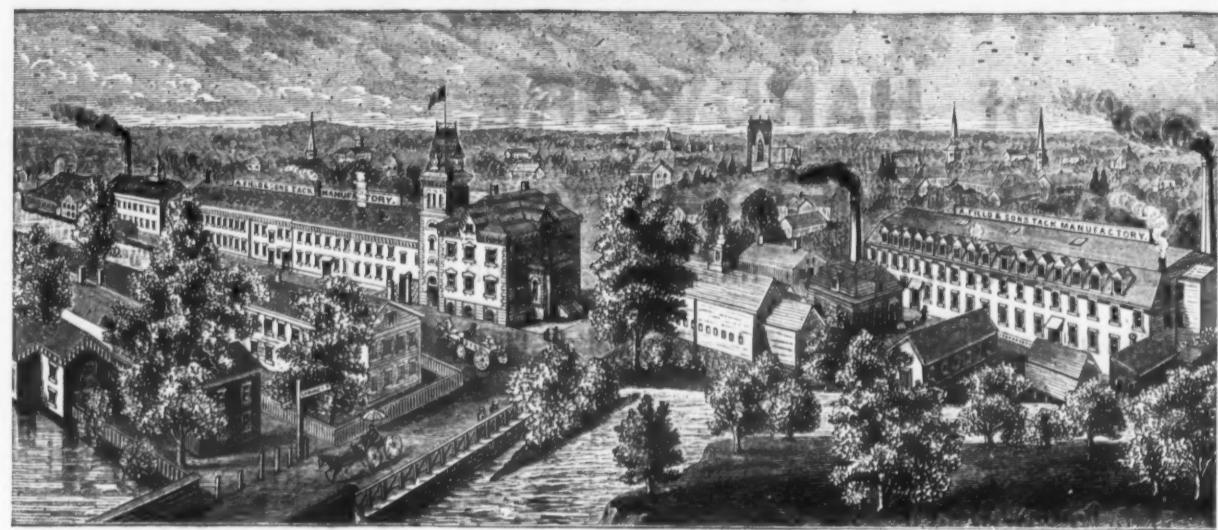
OFFICE & WORKS—Foot of Wason St., on Lake Shore  
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**STREBEL & WEISBRODT**  
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## TACKS OF ALL KINDS.

*Shoe Nails, Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks, Glaziers' Points, Etc.*

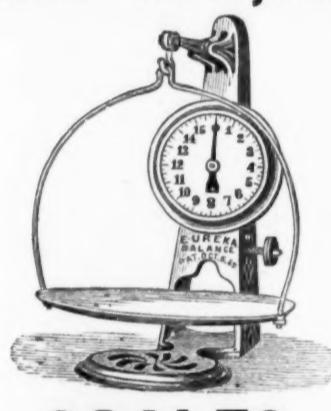
**OFFICES AND FACTORIES AT TAUNTON, MASS.** WAREHOUSE AT 75 CHAMBERS STREET, N. Y., where may be found a full assortment of Tacks, Brads, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

*Any variations from the regular size or shape of the above-named goods made from samples to order.*

**Hoisting Machinery**  
Manufactured by  
Crane Bros. Mfg. Co.,  
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### Eureka Self-Adjusting



### SCALES.

Has a patented attachment for ascertaining the *tare* of a dish or other receptacle used in weighing without the use of weights or loss of time.

Manufactured only by

**JOHN CHATILTON & SONS,**  
91 & 93 CHURCH ST., NEW YORK

**HARKINS & PRAY,**  
Bristol, Pa., Manufacturers of

**The Ball Tuyere Iron**  
AND  
**TIRE BENDERS.**  
FINE GRAY IRON CASTINGS of all kinds made to order.

Oldest and Largest Establishment of the kind in the U. S.

**F. L. & D. R. CARNELL,**  
844 Germantown Avenue, Philadelphia  
Manufacturers of Pennsylvania Brick Machine  
Little Giant Pipe Machine, Fire and Red Brick  
Presses, Clay Wheels, Tile Machines, Stampers,  
Grinding Pans, Brick Yards fitted out for running  
by steam or horse. Heavy and Light Castings. Send  
for circular.

### PRIZE MEDALLISTS:

London, 1862; Oporto, 1865; Dublin, 1865; Paris, 1867; Moscow, 1873; Vienna, 1873, and **only**  
**Award and Medal for Self-Colling Steel**  
**Shutters at Centennial Exhibition,**  
Philadelphia, 1876.

### CLARK & CO.,

ORIGINAL INVENTORS AND SOLE

PATENTEES OF

Noiseless Self-Coiling Revolving

### STEEL SHUTTERS,

FIRE AND BURGLAR PROOF.

Also Improved

### Rolling Wood Shutters

Various kinds. Clark's Shutters are the **Best** and **cheapest** in the world. Are fitted to new *Typhoo* Building, *Leeds Library*, *Delaware and Hudson Canal Co.'s Building*, *Transatlantic Steamship Co.'s new Dock*, *American News Office, &c.*, *Posey County Court House, Mt. Vernon, Holt County Court, Oregon, Mo.*, *Also to buildings in Boston, Cincinnati, Detroit, Janesville, Wis., Baltimore, Canada, &c.* Built for years in daily use in every principal city throughout Europe, and are endorsed by the **Leading Architects of the World.**

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### ANSONIA CORRUGATED STOVE PLATFORM

Manufactured by the

**Ansonia Brass & Copper Co.**  
Office, 19 & 21 Cliff Street,  
NEW YORK.



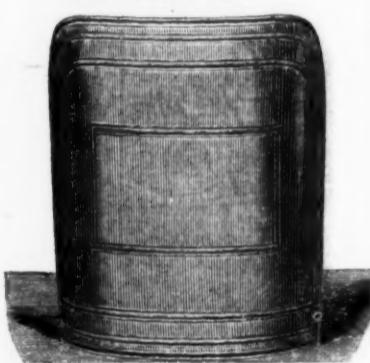
Cut Showing Round Platform.  
Section Showing Edge.

**ANSONIA**  
**Bronzed Fire Screen,**  
With Ornamented Mouldings.

PATENT APPLIED FOR.

**The Portable Bronzed Fire Screen**, or **Shield**, as shown in the illustration, is especially designed for the safety and protection of walls, furniture, woodwork, paper or varnish from heat.

Being constructed of metal, with firm and substantial edges, curved in form to stand alone, it may be easily adjusted to any position about a stove, before a great fire place. The demand for something useful, durable and ornamental as a Fire Screen has long been felt, and having finally accomplished the desired result, we are prepared to fill all orders promptly.



### To the Hardware Trade.

A general assortment of

### HARDWARE

For the country trade constantly on hand.

**JOHN I. BROWER & SON, 288 Greenwich Street, New York.**

JOVETT'S HORSE RASPS, 16 IN.

Agents for Mahanay's 1/2 Tire Shrinker. Send for Circular.

### L. BAILEY'S POCKET BLOCK PLANE

We desire to call special attention to our New **JONERS' POCKET BLOCK PLANE**. We believe this tool when once seen will speak for itself more than any description. It is a pocket block plane, both in construction and operation, and the neatest working tool ever made, and specially recommended for amateurs, pattern makers, light scroll saw work, etc., etc.



Send by mail, postage paid, on receipt of price.

Send for Illustrated Catalogue and Price List. Manufactured by

**LEONARD BAILEY & CO., Hartford, Conn.**

### DARLING, BROWN & SHARPE

Providence, Rhode Island,

MANUFACTURERS OF

### United States Standard Rules,

AMES' UNIVERSAL SQUARES,

Patent Hardened Cast Steel Try Squares,

### THE AMERICAN STANDARD WIRE GAUGE,

Bevel Protractors, Hardened T Squares and Bevels, Center Gauges, Steel,

German Silver and Boxwood Triangular Scales, Venier Calipers,

Caliper Squares and Rules, Plumb Bobs,

Paper Drawing Scales, Willis' Odontographs, Steel Straight Edges

and T Square Blades.

MEDALS AWARDED: Paris Exposition, 1867; Vienna Exposition, 1873; Philadelphia, 1876.

Illustrated Catalogue sent per mail on application.

### Final Closing of the Great Iron Works of G. B. Thorneycroft & Co.

The London *Iron Trade Exchange* says: For more than half a century the firm of Messrs. G. B. Thorneycroft & Co. have occupied one of the most prominent positions as iron manufacturers in the kingdom, and during the last 40 years have carried on the largest concerns in the Wolverhampton district, for the manufacture of marked bars and all kinds of best iron, at the Shrubbery, Swan Garden and Bradeley Iron Works. Twenty-five years since the Bradeley works were discontinued in favor of a general concentration at Wolverhampton, the Swan Garden Works being then added, which since that period has completed the group of mills and forges belonging to this eminent company. The firm have at the New Side rolling power and all accessory machinery to roll the largest plates and the longest angles of any house in South Staffordshire. They made charcoal iron and various specialties, and rolled their large plates with reversing rolls; besides these works, they had two blast furnaces and extensive collieries at Bradeley, on a mineral estate, which cost £90,000; the latter have been idle some time.

The cause of this unhappy and distressing event for Wolverhampton, will be found in the manly and candid parting address delivered by Col. Thorneycroft to his workmen at their final interview. The reasons for closing these works are precisely the same as those which induced Mr. Crawshay to shut up Cyfarthfa, in Wales. Both, alas, present a melancholy lesson to the men in regard to their folly in demanding wages which drive the ironmasters to ruin, or compel them to follow the example of Messrs. Crawshay and Thorneycroft, in closing their works and giving up the trade.

Before leaving this melancholy subject, this being one of the leading representative firms of South Staffordshire, we feel it will not be out of place to give a short history of the rise and progress of this firm. The cause of its stoppage will require no explanation. Every ironmaster in England, with very few exceptions, may read the cause in the balance sheet of his own working during the last twelve months, and our general readers cannot be ignorant of the fact, that if any trade or manufacture, no matter from what cause, yields loss instead of profit, the only course left is to avoid the loss by stopping the works; Thorneycroft & Co. adopted this course.

In 1782 and 1784, Henry Cort invented groove and rolling and puddling, the two inventions which have so marvelously expanded the iron trade. The only iron works of importance then in existence were the Kirkstall Forge, at Leeds, the oldest; Messrs. Hunt's, of the Brades; the Darbys, of Coalbrookdale; the Carron Company, of Scotland; the Ketley Company, in Shropshire; Old Squire Addenbrooke's, of Moorcroft; and one or two others. All these made iron on the old system. Puddling was unknown, groove rolling not invented, and all bars and other kinds of manufactured iron were formed under the hammer. The difficulty in puddling was great; it was necessary to invent some method of partially decarbonizing the iron before submitting it to the puddling process, and, as may naturally be supposed, at this period the refining of iron was of the greatest importance, and was kept a profound secret, but was carried on successfully by Mr. Reed and Mr. Parker, at Tipton, in Staffordshire. The two best practical refiners of iron in the country at that day were Philip Williams and Edward Thorneycroft, both residing in Tipton parish. Mr. Beecroft, one of the authorities of Kirkstall Forge, engaged Edward Thorneycroft to go down to Leeds as a refiner of iron, under a written covenant for 7 or 14 years, at high wages. Old Edward took his two sons, Edward and George, and honorably carried out his agreement to refine the iron for the Kirkstall Forge Co. The lads grew up, and were engaged in the works. Old Edward now returned to Staffordshire. Edward and George Thorneycroft, being about 21 or 22 years of age, returned at the same time with their father, and at once engaged themselves at the old Squire Addenbrooke's Works, Moorcroft. George was noted for aptness to business and general intelligence, and was soon employed by the squire in confidential commercial business; and it was on one of these errands that his straightforward conduct and manly form caught the eye and touched the heart of the best woman in the world, who has long since been in heaven. She was a wife, a mother, a friend and a Christian in every sense of the word. The Shrubbery Works were now commenced on a very small scale in an old barn, and the twin brothers joined partnership; Edward watched the manufacture of iron closely; George attended to the commercial department with energy and great ability. The knowledge these gentlemen obtained under the Butlers at Kirkstall Forge, enabled them to make superior iron. George Stephenson, Brunel and other eminent engineers, endorsed the excellency of their brand of iron. The works were enlarged; the concern grew and prospered, and George Thorneycroft was looked up to as one of the representative ironmasters of Staffordshire, and was unanimously elected first Mayor of Wolverhampton, and exercised more influence than any other man in that district; and, to the honor of his memory be it said, his munificence to all charitable and religious objects constantly ran *pari passu* with his accumulating wealth. Mr. Thorneycroft left one son, the present Colonel, and four daughters; the second daughter was married to John Hartley, Esq., the younger brother of our old friend James Hartley, the ex-M. P. for Sunderland, who, after the death of his father-in-law, for many years took the management of this important concern. By an accident Mr. Hartley's business power was somewhat enervated, and from this period the active management devolved on Mr. John Perks, Jr., but during the last two years on Mr. George Hartley and the colonel.

The partners in the firm are John Hartley, Esq., of Tonge Castle, Col. Thorneycroft, Tottenhall Wood, Mr. George Hartley and Mr. John Perks, of Slade Hill. The closing of these works will be an awful blow to Wolverhampton, for the collieries and smelting works at Bradeley, and the Wolverhampton group of mills and forges when in full operation employed more than 2000 pairs of hands. We cannot close this notice without saying how regular and punctiliously business was done at the Shrubbery, and testifying to the high commercial position of this firm, the name of which was never tarnished or suspected during the commercial storms occasioned by the crashing panics of 1847 and 1857; and it is a source of deep regret that a name and brand of iron, so well known and appreciated in every government dockyard and engine shop in Europe, should cease to exist, and no longer minister to the grandeur and respectability of the South Staffordshire district.

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### The English Rail Exports.

The London *Mining Journal* has the following upon the British export of rails:

Although these are undoubtedly dull times, it is not unsatisfactory to note that the external demand for our rails has somewhat improved this year. The exports of our steel rails have especially experienced a rather important expansion, showing that the value of this description of rails is more and more appreciated. Even the United States, in spite of the remarkable development of American metallurgical industry since 1870, and in spite, too, of the severe protective tariff imposed by Congress, have been fair to take our steel rails to the extent of 404 tons this year. Russia has been a large purchaser of our steel rails this year, having taken 71,252 tons to November 30, as compared with 62,458 tons in the corresponding period of 1876. Steel rails are much more calculated to resist the severe climate of Russia than iron rails, and that the Russians have come to this conclusion is evidenced by the fact that for every 17 tons of steel rails which we have sent them this year, they only took 1 ton of iron rails. It may be interesting to illustrate this by the severe light of statistics, and we have accordingly compiled the annexed short table showing the exports of iron and steel rails to Russia during the first 11 months of the last two years:

RAILS EXPORTED TO RUSSIA.		
Iron.	1876. Tons. 12,625	1877. 1877.
Steel.	" 62,458	" 4,238
Total.	" 75,083	71,252

The exports will be seen to have been about the same extent during each of the two years, but the proportion of iron to steel rails exported has sunk from 1 in 5 tons to 1 in 17 tons, and the Russian demand for our iron rails would thus appear to be practically disappearing altogether. A somewhat similar result is observable if we institute a similar comparison with regard to the shipment of our rails to British India;

RAILS EXPORTED TO BRITISH INDIA.		
Iron.	1876. Tons. 30,404	1877. 19,112
Steel.	" 9,973	" 28,822
Total.	" 40,377	47,934

The proportions sustained by the iron and steel rails exported will be seen to have been completely reversed during the last two years, the exports of iron rails having fallen off some 33 per cent., while those of steel rails have expanded nearly threefold. It is, however, rather curious to notice that iron rails have more than held their own this year in the Australian colonies, although the consumption of steel rails in those dependencies has at the same time also increased. We have recourse to figures again to illustrate this observation:

RAILS EXPORTED TO AUSTRALASIA.		
Iron.	1876. Tons. 10,318	1877. 1877.
Steel.	" 10,293	" 43,491
Total.	" 20,609	67,432

# RUSSELL & ERWIN MANUFACTURING COMPANY

## Manufacturers of HARDWARE.

FACTORIES, - - - - NEW BRITAIN, CONNECTICUT, U. S. A.

MANUFACTURERS' AGENTS AND DEALERS IN GENERAL HARDWARE AT OUR

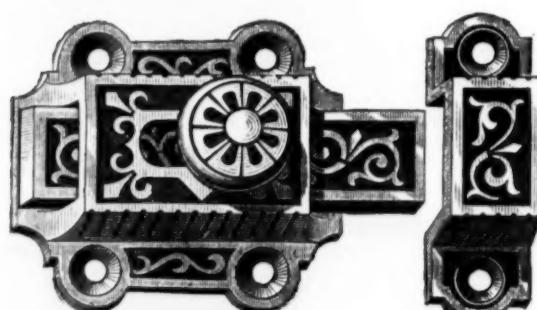
WAREHOUSES: NEW YORK, 45 & 47 Chambers Street; PHILADELPHIA, 425 Market Street; BALTIMORE, MD., WM. H. COLE, Agent, 17 South Charles Street.



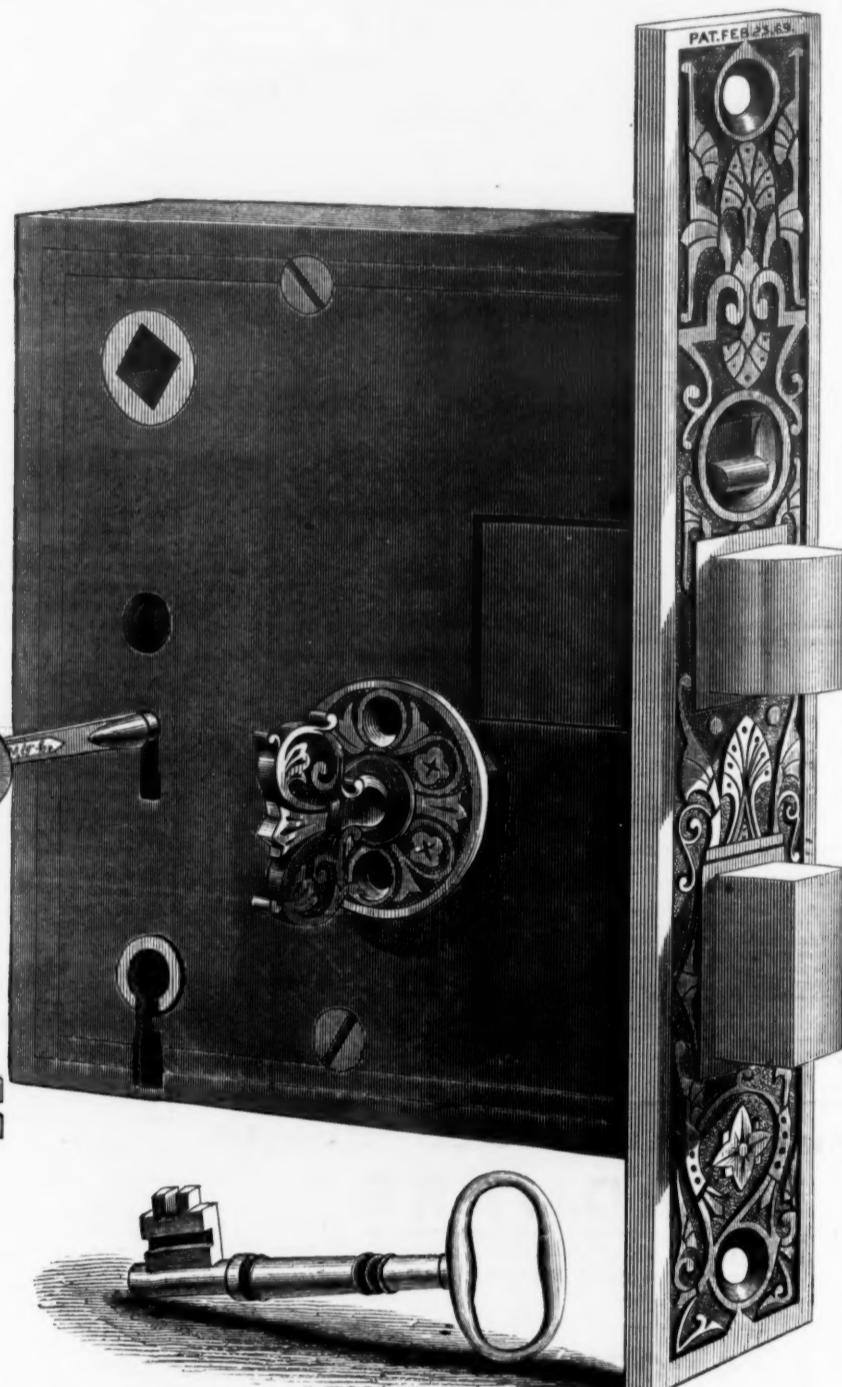
Fancy Bronze Escutcheon, No. 500.  
To Fit Lock No. 700.



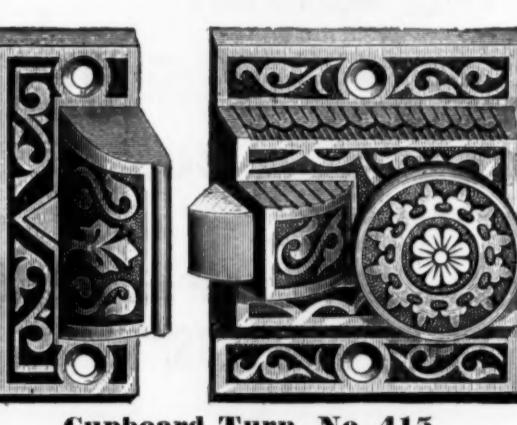
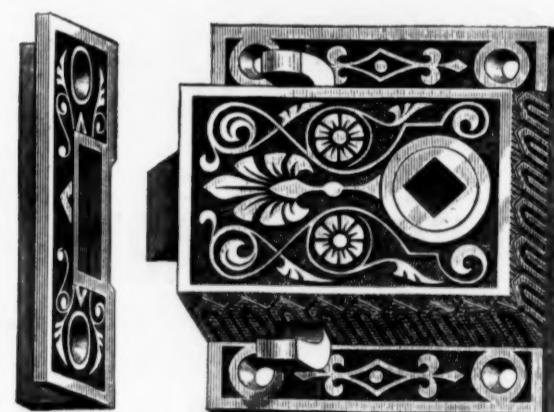
Fancy Bronze Sash Lock, No. 51.



Kahala Cupboard Bolt.



Fancy Bronze Front Door Lock, No. 700.



Cupboard Turn, No. 415.



Screen Door Catch, No. 8500.



Bronze Shutter Knob, No. 33.



Bronze Door Knob.



Bronze Bell Pull, No. 933.

## Cutlery.

## FRIEDMANN &amp; LAUTERJUNG,

Manufacturers of PEN AND POCKET CUTLERY.

Solid Steel Scissors, Shears, Razors,  
Russia Leather Straps, Hones, &c.

Sole proprietors of the renowned full concave patent

"ELECTRIC RAZORS,"  
And the "ELECTRIC SHEARS." Nickel Plated  
Agents for the BENGALL RAZORS.AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.  
91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

## MERIDEN CUTLERY CO.

The Oldest Manufacturers of Table Cutlery in America.



EXCLUSIVE MAKERS OF THE

## CELLULOID

Or "PATENT IVORY" KNIFE. The handsomest and most durable substitute for Ivory known. Also makers of all kinds of TABLE, BUTCHER AND HUNTING KNIVES.

Illustrated catalogues with prices sent to the trade on application. 49 Chambers St., New York.



The Miller Bros. Cutlery &amp; U. S. Steel Shear Co.'s "Consolidated."

Centennial Award for best Quality and Finish.

Pocket Cutlery and Solid Steel Shears and Scissors.  
J. C. WILSON & CO., 81 Berkman St., New York Agents.  
E. L. COOPER, 48 Warren St., New York Special Agent.  
THE MILLER BROS. CUTLERY CO., West Meriden, Conn.HALL, ELTON & CO.,  
Electro Plated Ware, German Silver and Britannia Spoons.

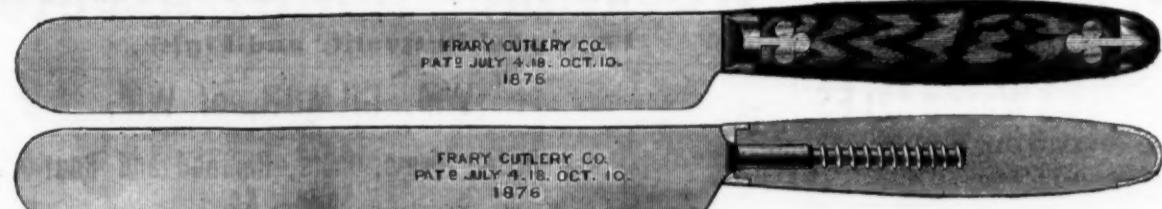
Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.

## THE FRARY CUTLERY COMPANY,

FACTORY, Bridgeport, Conn. NEW YORK OFFICE &amp; WAREHOUSE, No. 82 Chambers St.

## Manufacturers of all kinds of Table Cutlery.



The above illustrations represent their New Patent Screw Tang Fast Solid Handle Knife.

There is no question but that a solid handle knife is much more preferable than a scale tang. The great objection to their use hitherto is, that no solid wood handle has been placed on the market with the handle properly secured—no handle put on with cement will stand the wear and tear of every day usage. The cement will expand and contract with the action of heat and cold, and become loose, crack and come off, causing great prejudice against their use. This objection is overcome in our patent screw tang. A wood screw is welded to the tang of the knife or fork, and screwed firmly and securely in the handle and locked there by the bolster, making a very strong neat and handsome knife, which we warrant never to get loose, crack or come off. We manufacture a large variety of patterns, both Table, Butchers and Carvers, and furnish the patent handle nearly as low as the scale tang. We are prepared to furnish this line of goods, together with the scale tang and iron handle, very promptly, and very respectfully invite the attention of the trade.

SILVER PLATED SOLID STEEL  
HANDLE KNIVES.

We guarantee 12 dwts. of fine silver on each dozen of Table or Medium Knives. All our Spoons, Forks, &amp;c., made of 18 percent. Nickel Silver. We warrant our extra plate.

On TEA SPOONS 3 1/4 Ounces per gross.  
" DESSERT SPOONS 3 1/4 " "  
" DINNER SPOONS 5 " "  
" DESSERT FORKS 3 1/4 " "  
" MEDIUM FORKS 5 "



HARTFORD, CONN.

FRARY CUTLERY CO.  
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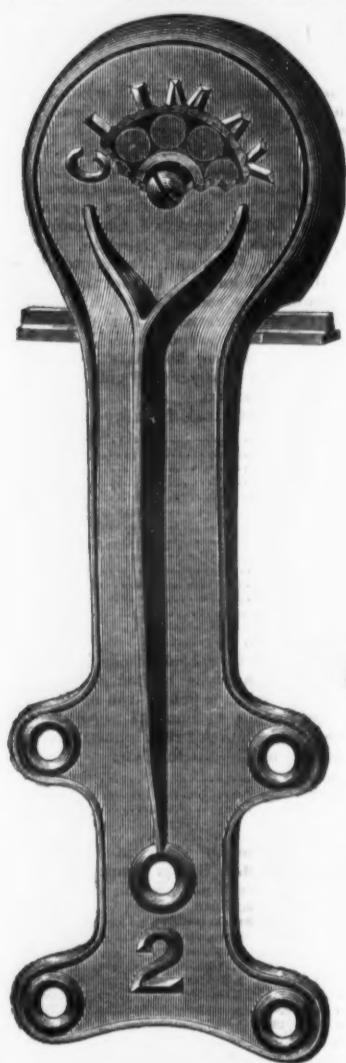
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## "Climax" Barn Door Hangers, Moore's Anti-Friction Sliding Door Sheaves, &c.,

MANUFACTURED BY

### S. H. & E. Y. MOORE,

68 Lake Street, Chicago, Ill.



REDUCED PRICES.

"Climax" Barn Door Hangers.....	Discount 50 per cent.
"Acme" " " " Rollers.....	50 "
Sliding Door Sheaves, Moore's Anti-Friction.....	45 "
Parlor Door Hangers, " " "	45 "
Dumb Waiter Pulleys, " " "	45 "
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### S. H. & E. Y. MOORE,

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SOLE MANUFACTURERS OF



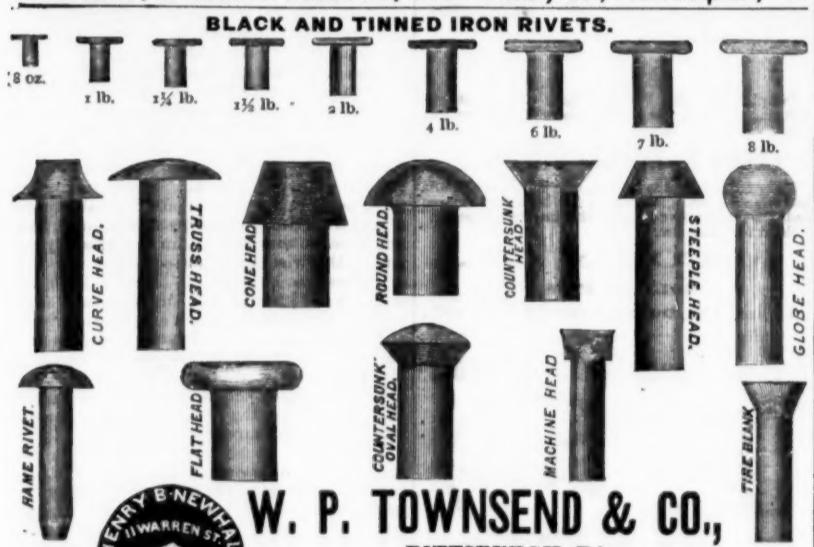
## "STAR" Philadelphia Bolt Works.

NORWAY IRON



FANCY HEAD BOLTS.

Carriage & Tire Bolts. Star Axle Clips, &c.  
TOWNSEND, WILSON & HUBBARD, 2301 Cherry St., Philadelphia, Pa.



W. P. TOWNSEND &amp; CO., PITTSBURGH, PA.

Manufacturers of every description of First Quality,

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John St., Bridgeport Conn., Manufacturers of

THE VERY BEST SPRINGS AND AXLES.

Our Standard Springs, weighing about half as much as the Springs of other makers, to do the same work easier and cost less. Shop newly stocked with new and improved Machinery. Send for Price Lists.

Lewis's Torsion and Cross Springs. Supersedes the Brewster Cross and End, dispenses with side spars, weighs less, hangs evenly low, ride more easily, and cost less. Shop newly stocked with new and improved Machinery. Send for Price Lists.

W. H. WILSON Prest. and Treas. O. P. LEWIS (formerly of Spring Perch Co.), Secy. and Supt.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,  
Butchers' Choppers,  
Axes and Hatchets,  
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FOR SALE BY MARTIN DOSCHER Agent, 96 Chambers Street N. Y.



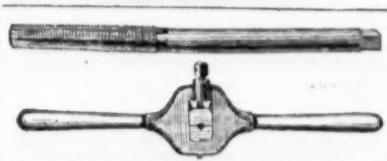
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Carriage &amp; Wagon AXLES.

WINSTED, CONN.

ESTABLISHED 1839.



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Sole Manufacturers of

GODDARD'S PATENT-RELIEVED

Machinists' and Gas Fitters'

TAPS,

AND SOLID REAMERS,

AND DEALERS IN

Machinists' Supplies.

E. A. GODDARD,

Late N. Y. Tap &amp; Die Co.,

General Sales Agent, 14 Dey Street, New York.

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Manufacturer of all kinds of

First-Class Saws, Saw Frames, Cross-Cut Handles, Tools, Files, &amp;c. Also Sole Proprietor and Manufacturer of the Genuine Patent Lightning Saw.

80 BEEKMAN STREET, NEW YORK.

## TRIAL OF THE IMPROVED LIGHTNING SAW.

The Emperor, Dom Pedro, accompanied by Director General Goshorn, Superintendent Albert, and others, visited Machinery Hall, at the Centennial on the evening of June 28th. Among other things inspected, at the invitation of E. M. BOYNTON, of New York, they witnessed a trial of the New Lightning Saw, patented March 26, 1876. Two men, with one of these saws, cut off a sound log of gum-wood, one foot extreme diameter, in seven seconds, or at the rate of a cord of wood in five minutes. Messrs. Corliss, Morell, Lynch, and other members of the commission, witnessed the trial and timed the cutting. The Emperor remarked, That was fast, very fast cutting. Last evening the Emperor made another examination of the saw.—Philadelphia Press, June 30.

BOYNTON'S SAWS were effectually tested before the judges at the Philadelphia Fair, July 6th and 7th. An ash log, eleven inches in diameter, was sawed off, with a four-and-a-half-foot lightning cross-cut, by two men, in precisely six seconds as timed by the chair man of the Centennial Judges of Class Fifteen. The speed is unprecedented, and would cut a cord of wood in four minutes. The representatives of Russia, Austria, France, Italy, Spain, Belgium, Sweden, England, and several other countries, were present, and expressed their high appreciation.

Received Medal and Highest Award of Centennial World's Fair, 1876.

\$1000 Challenge was prominently displayed for six months, and the numerous saw manufacturers of the world dared not accept it, or test in a competition so hopeless.

## Wheeler, Madden & Clemson MFG. CO.,

MIDDLETOWN, - - - NEW YORK.

Manufacturers of

WARRANTED CAST STEEL

## SAWS

Of every description, including

Circular, Shingle, Cross-Cut, Mill, Hand,  
WOOD SAWS. Etc.. Etc.

## Harvey W. Peace, Vulcan Saw Works.

Manufacturer of every kind of

Patent Ground

TRADE MARK  
HARVEY W. PEACE & CO. CIRCULARS, CROSS-CUTS, MILL  
MULAY, GANG, HAND,  
AND BUTCHER.

SAWS.

Molding and Planing Knives.

Plastering Trowels, Mitering Rods, &amp;c.

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AMERICAN SAW CO.,

Manufacturers of

Movable Tooled Circular Saws,  
PERFORATED CROSS-CUT SAWS  
And SOLID SAWS of all kinds.

Trenton N. J.

## HOOPES & TOWNSEND, PHILADELPHIA, PA.,

MANUFACTURE

Machine &amp; Car Bolts.

TANK AND COOPERS' RIVETS,

COLD PUNCHED

Square and Hexagon

BRIDGE RODS AND BOLTS,

WOOD SCREWS,

NUTS, WASHERS, CHAIN LINKS.

COLD PUNCHED

"Keystone" Boiler Rivets,

Unequalled in Quality and Finish.

## WM. GILMOR, of WM.

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Spikes, &amp;c.

BALTIMORE.

FOR FALL TRADE.

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Price List and Discounts.

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TURNED  
MACHINE SCREWS,

One-sixteenth to five-eighths diameter.

Heads and points to sample.

IRON, STEEL and BRASS.

Lyon &amp; Fellows Mfg. Co.,

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Manufacturers of the

## BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

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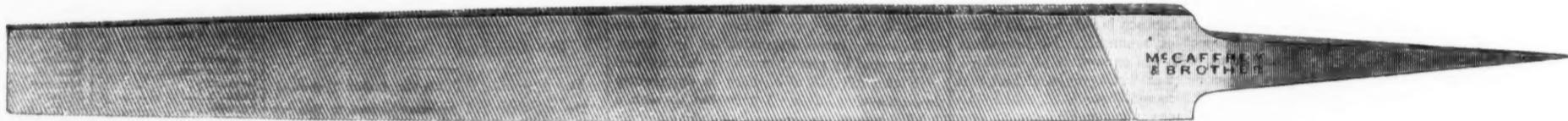
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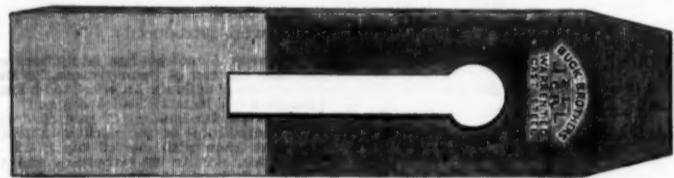
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N. S. ARNOLD & CO., 310 California Street, San Francisco. Sole Agents for the Pacific Coast.



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The most complete assortment in the U. S. of Shank, Socket Firmer and Socket Framing Chisels,

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Gouges of all lengths and circles, beveled inside or outside. Nail sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

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**Heavy and Wagon Hardware,**

**BOLTS AND NUTS**

OF ALL KINDS,

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Etc., Etc.

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**THE D. R. BARTON TOOL CO.,**

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BEST BRANDS SOLD.

**X BULLION,**

89.50 per doz.

**E LIPPINCOTT'S,**

89 per doz.

**S DIAMOND,**

88 per doz. Cash, 30 days.

**A X E S**

Made in PITTSBURGH by

**HUBBARD, BAKEWELL & CO.**

Sold by Everyone who keeps good Hardware.

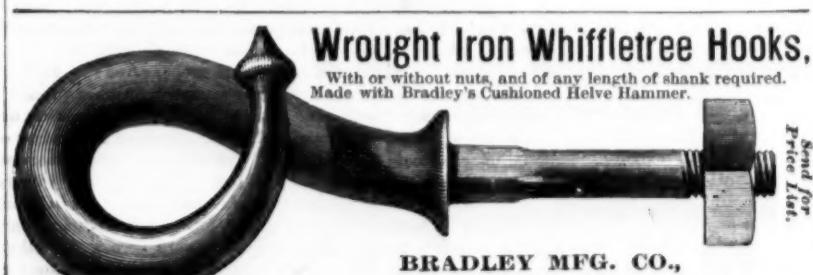
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**Fluting & Smoothing Iron.**



It can be used as an ordinary Smoothing Iron. It is a Fluting Machine as well as a Smoothing Iron. It is made of brass, and convex in form, it has all the advantages of the crank machine. It combines the two articles in one, taking up the room of but one machine, and is always ready for use.

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**Wrought Iron Whiffletree Hooks,**

With or without nuts, and of any length of shank required.

Made with Bradley's Cushioned Heave Hammer.

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*Chicago, Ill., and Syracuse, N. Y.*

# The Iron Age.

New York, Thursday, January 17, 1878.

DAVID WILLIAMS . . . . . Publisher and Proprietor.  
JAMES C. BAYLES . . . . . Editor.  
JOHN S. KING . . . . . Business Manager.

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83 Reade Street, New York.

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77 FOURTH AVENUE.  
JOS. D. WEEKS, Manager and Associate Editor.

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AUSTRALIAN AGENCY.  
The American Hardware Company, Melbourne, are our agents for Australia. Sample copies will be mailed by them, free of charge, to any firm engaged in the trades we represent in Australia, Tasmania and New Zealand.

### CONTENTS.

First Page.—Weston's Differential Pulley Blocks. Bright Outlook in the Schuylkill Valley. Labor in the Rolling Mills and Mines. New Steam Street Car. Paraffine Oils and the Metals.

Third Page.—Leggett's Patent Variable Hose Nozzle. Manufacture of Asphaltum. Decision Important to Travelers.

Fifth Page.—The New Iron District of Ohio. Mechanics' Technical School. The Hot-Blast of the Lucy Furnace. Keeley's Rival, the Bradley Promethor. Hydraulics in Warfare. Torpedoes in Europe.

Seventh Page.—The Paris Exposition—Disposition of Space. New Patents.

Ninth Page.—Final Closing of the Great Iron Works of G. B. Thorneycroft & Co. The English Rail Exports.

Eleventh Page.—Production of Precious Metals for 1877. Franklin on Encouragement to Home Industry.

Fourteenth Page.—The Condition and Outlook for Charcoal Iron. How Peace in the East would Affect Trade. Arbitration in Trade Disputes. The World's Railroads in 1876. The Difference Between Them.

Sixteenth Page.—Industrial Items.

Seventeenth Page.—National Association of Stove Manufacturers.

Eighteenth Page.—National Association of Stove Manufacturers (Concluded).

Twenty-first Page.—Trade Report. General Hardware—British Iron Market. Iron, Metals, Old Metals, Paper Stock, &c.

Twenty-second Page.—Exports, Imports. Co. Philadelphia. Pittsburgh. Chattanooga. Boston.

Twenty-third Page.—St. Louis. Chicago. Louisville. Baltimore. Cincinnati. Richmond. Foreign. Our English Letter.

Twenty-fourth Page.—Our English Letter (Concluded). Scotch Pig Iron.

Twenty-seventh Page.—The Iron Age Directory.

Thirty-first Page.—New York Wholesale Prices.

Thirty-first Page.—New York Wholesale Prices (Concluded).

Thirty-fifth Page.—Philadelphia, Buffalo, Chicago and Pittsburgh Hardware and Metal Prices.

Thirty-seventh Page.—Boston and St. Louis Hardware and Metal Prices.

The Commercial National Bank of Cleveland, Ohio, in anticipation of the resumption of specie payments in 1879, has voted to hold as part of the reserve fund of the bank all the gold hereafter received as interest on bonds held by the government to secure its circulation. At first thought this would seem a wise move, but the question arises whether such action will not interfere with resumption if, as the result of the present contest in Congress, it is decided to allow the resumption act to remain as it is and resumption to take place at the date fixed. Something over \$5,000,000 of interest will fall due between this and January 1st, 1879, and if the \$20,000,000 or more that will go to the banks be all hoarded, it will throw quite an obstacle in the way of the accumulation of coin by the Treasury. We also notice that some of the largest financial institutions in this city are refusing to loan money in the West ex-

cept on a gold basis. All this points to the belief that resumption is sure to come—or, at least, that capitalists are preparing for it.

### The Condition and Outlook for Charcoal Iron.

The branch of the iron industry that is most seriously affected by the present depression is that of charcoal pig iron. The number of furnaces out of blast and the reduction in make and price, have been much greater in this branch than in either anthracite or bituminous. On the 1st of January for the past four years, its relative condition compared with the two latter, determined by the number of stacks in and out of blast, is shown in the accompanying table, giving the number and percentage of both active and idle furnaces at the beginning of the current and three preceding years:

NUMBER OF FURNACES IN BLAST JAN. 1.

1875. 1876. 1877. 1878.  
Charcoal . . . . . 158 95 73 79  
Anthracite . . . . . 130 100 87 68  
Bituminous . . . . . 57 98 84 56

Total . . . . . 363 293 244 203

NUMBER OF FURNACES OUT OF BLAST, JAN. 1.

1875. 1876. 1877. 1878.  
Charcoal . . . . . 145 186 209 182  
Anthracite . . . . . 87 125 136 121  
Bituminous . . . . . 96 109 123 132

Total . . . . . 328 420 468 419

To make the point more evident, we give tables showing the percentages of the whole at different dates:

PERCENTAGE OF FURNACES IN BLAST, JAN. 1.

1875. 1876. 1877. 1878.  
Charcoal . . . . . 51 34 26 29  
Anthracite . . . . . 60 40 39 43  
Bituminous . . . . . 46 47 45 39

PERCENTAGE OF FURNACES OUT OF BLAST, JAN. 1.

1875. 1876. 1877. 1878.  
Charcoal . . . . . 49 66 74 71  
Anthracite . . . . . 40 60 61 57  
Bituminous . . . . . 54 53 59 61

While 36 per cent. of the furnaces of the country were in blast the first of this month, only 29 per cent. of the charcoal furnaces were in operation. This discrepancy is even greater than is apparent, as anthracite and bituminous furnaces have largely increased their make, which is not true of charcoal. This of course indicates a large reduction in make. According to Mr. Swank's figures, it fell from 577,620 tons in 1873 to 308,649 tons in 1876, and the reports for 1877 will probably show a still greater decline.

In price the decline has been more than one-half since 1873. No. 1 Hanging Rock charcoal iron was quoted at \$47 in Cincinnati the last of August, 1873, and at \$23 in 1877. Lake Superior Charcoal Iron No. 1 was quoted at \$58 to \$60 in Cleveland the 1st of January, 1873, and at \$22 to \$25 the 1st of January, 1875. Missouri, at St. Louis, \$56 in January, 1873, and \$22 in January, 1878.

All this has produced a feeling of utter discouragement among charcoal furnacemen, and the outlook at the beginning of this year is as blue as can well be imagined. To show more in detail the condition in the different sections and the prospect, we give the following information collected from a large number of letters received during the past few days.

In New England but one-third of the charcoal furnaces are in blast. Every Massachusetts furnace is out, with no immediate prospect of resuming. No furnace in that State, with the exception of Cheshire, has any stock of materials on hand, and that has about six months' stock of coal. The make of pig iron in this section during 1877 about equaled the demand, diminishing the stock perhaps 1000 tons. In Connecticut five furnaces are blowing, and in the adjacent New York district, working on similar ores, only two. In other parts of New York the situation is much the same. The Fletcherville Furnace will make no more iron, and others are practically abandoned, though, should there be any demand for charcoal iron in the future at fair prices, some of the locations and what of the old stacks and machinery there may be left will probably be utilized.

In Pennsylvania the manufacture of charcoal iron is established under conditions favoring a longer lease of active life. The furnaces are in most cases small, situated where charcoal is easily procurable and near to a market, or the product is worked into blooms on the spot and the labor is often times "all in the family," so that the cost is low. These advantages will enable the furnaces of that State to run when others cannot, but at best they can make little iron, and when the works shall need extensive repairs it will be questionable if it will pay to make them. There are furnaces in this State in good condition, with every advantage—the Big Pond Furnace, for example, with abundance of iron ore on the property, and a good stock of coal in the coal houses, the owners of which question the expediency of starting. A gentleman of experience in the furnace business writes us:

"Our furnace was blown out in August, and has been idle since. We are making no preparations for another blast. Think we will not for a few years."

In Maryland there is just about demand enough to take the product and wisdom enough among the furnacemen to keep the market in that condition.

In Virginia only four furnaces are in blast. The stocks are very small, not exceeding 4000 tons, but they are quite enough for any present demand. Makers of charcoal iron in this section are thoroughly disheartened, and many say they never expect to make any more. Others say they will blow in when they can contract for a season's make at figures \$5 per ton above present

market rates. There is, however, no prospect of such an advance. In West Virginia, furnaces that have been out of blast for years have still considerable iron on hand, and charcoal furnacemen have come to the conclusion that there is no use blowing in, as it will only add to the stocks.

In North Carolina only one furnace is making any preparations to run, and it is doubtful if that will start.

In Tennessee, Georgia and Alabama there is a desolate array of furnace stacks that are idle and will remain so until prices improve.

In the Hanging Rock region of Ohio and Kentucky there are large number of furnaces that will never go in blast again—at least as charcoal furnaces. Some of the oldest and most successful furnace owners of this section are having careful investigations made of the bituminous coal properties in this region with a view to working their furnaces on coke, and the indications are that with proper washing and coking native coals can be used.

In Missouri, only two charcoal furnaces are in blast and the stocks of pig iron are very heavy.

The outlook in Lake Superior was very ably shown by our valued correspondent, Mr. E. C. Pechin, in our issue of Jan. 3, to which we refer our readers.

The views which we have set forth, and which are not ours but those of well-informed and prominent furnacemen in the sections named, are certainly disheartening. The difficulties which beset the industry seem to arise in many cases from causes for which there is no prospect of a cure. Prices may, and probably will, increase, so that in those regions where the difficulty comes from low prices of product the charcoal iron industry may revive somewhat, but this does not reach the trouble arising from scarcity of wood and the increase in the price of charcoal. In this item the South seems to have a great advantage over any section of the North; but in all sections the industry must suffer from the fact that the excellence attained in coal and coke irons has gradually equalized the wide difference in quality hitherto existing in favor of charcoal pig. From present indications it is not improbable that we shall be able to dispense with charcoal irons for car wheels, as recent experiments show us that chilling irons as good as the best C. B., and freer from impurities, may be made from cold-blast coke irons, and at a cost but little greater than that of good Bessemer pig.

**How Peace in the East would Affect Trade.**

In an editorial in our issue of Oct. 26, 1876, entitled, "The War Cloud in Europe," we gave it as our opinion that in the event of a war between Russia and Turkey, European Turkey would in all likelihood soon be conquered. This event, although not accomplished as speedily as had been predicted by most people, is from all appearances but a question of a few weeks, or at most months. The progress of the Russian arms in Asia Minor has not been less marked, and we may look for startling events in that direction in the near future. With a bare exchequer, three dependencies in arms, discouraged by recent crushing defeats and without a reliable ally, there is apparently no alternative left for Turkey but to sign a ruinous peace, and the Sultan may consider himself fortunate if a square mile is left him in European Turkey, not to speak of the territorial losses and forfeiture of suzerainty which he may have to submit to in Asia and even in Africa. The year just opened is, therefore, pregnant with events in the East far transcending in immediate and ultimate importance those involved in the Crimean war.

In view of their vast possessions in the East, the British people naturally feel alarmed at the turn events are taking. The unruly Moslem element in India will be deeply impressed with the indirect moral defeat which Great Britain is suffering. But the possible complications which may here arise are so much subject to eventual British pluck and action, or the absence of both, that it would be idle to speculate on them at this early stage. What concerns us more immediately on this side is the immensity of a settlement between the belligerents.

That the war in the East has benefited a good many interests in this country, is evident. Cartridge manufacture, as well as that of arms, has been quite active during the past eighteen months, and we have supplied both belligerents, principally Turkey. Peace will seriously diminish this industry. The export of grain from Southern Russia, where three-quarters of last year's crop remain in store, will cause a decreased demand for our own cereals, and peace would restore a hundred thousand Russian peasants, now in the army, to field labor. There would also be a lessened demand for our provisions, and the tendency in the value of all this surplus produce left on our hands, with another year perhaps as abundant in prospect, will necessarily be downward. On the other hand, business in Europe, after the Eastern question is fairly settled upon what promises to be a permanent basis, will be looking up, and iron, steel, coal, metals and all sorts of manufactures will find a readier market. Capitalists will feel better disposed toward investments, and trade, freed of the incubus of political uncertainties, will revive, spreading its beneficial influence across the Atlantic. There are already many indications of

a revival in business in France and Belgium during the coming spring, and reports from Central Europe are also more hopeful.

We are so intimately connected in our varied trade interests with Europe, that we are always benefited by prosperity there. Prices of most commodities except bread-stuffs have come down to such a remarkable level on both sides of the Atlantic, that there is room now for a gradual improvement, and the prospect before us is, therefore, in any event encouraging, unless Congress should blight the promise of healthful recovery by unwise financial legislation of which we now have but little fear.

### Arbitration in Trade Disputes.

We give in another column the text of a bill which has just been introduced into the Pennsylvania Legislature, providing for the formation of Boards of Arbitration for the settlement of all disputes between labor and capital. The need of some more rational way of settling these disputes than the barbarous one of strikes and lockouts, is too evident to need discussion. Notwithstanding

its many and glaring defects, we have been inclined to favor arbitration—not as the best possible method of arranging these disputes, but as, perhaps, the most practicable. We had been led to this by the good results that have generally followed arbitration in England. It is not our intention to discuss the arguments for or against arbitration in this article, but to say that our sentiment in favor of arbitration has been considerably weakened by the failure of the workmen of England to accept the awards in good faith. In several cases recently, there have been positive refusals to abide by the result of arbitration, and in one case where a judge sat, the men applied for a new arbitration to the bench of judges, assigning as the first reason that the judge who gave the award had not been impartial, and privately explained to the judge himself that they only made this charge as an excuse for an appeal in the hope of securing a more favorable ruling.

The great trouble in most attempts to arbitrate will be found in the fact that the real party to the arbitration on the side of the men is the union, and the result will be accepted in good faith, rejected or not fairly lived up to, as the union shall determine. This has always been the main objection of iron manufacturers to arbitration. Whether it is a fatal one or not, can only be learned by experience in this country. English unions are so different from ours in many respects, and English workmen so much less intelligent as a class, that the expression there can only serve as indications of what the result would be. We confess to a desire to see a trial of arbitration under favorable circumstances in this country, but if it should fail because of the prenicious influence of agitators bent upon strife, employers will feel that they are not dealing with

# PARIS EXPOSITION.

## Library of American Books on Hardware, Mechanics and Metallurgy.

The interest excited in the minds of intelligent Europeans in the Mining, Metallurgical and Metal Manufacturing Industries of the United States by the reports of experts who visited our Centennial Exposition, as well as by the increasing volume of our exports of manufactured goods, will render the American Department of the Paris Exposition an object of much interest to intelligent foreigners. There are, however, many reasons why we shall be unable to make such a showing as will do us full justice, or satisfy the reasonable expectation of visitors interested in the metallurgical and manufacturing progress of this country. The tardiness of Congress in accepting the invitation of the French Government discouraged early efforts to prepare for the Exhibition; and now the shortness of the time before the opening, and the limited space allowed the United States, make it certain that, while many interesting specimens of ores, metals and their manufactures will probably be shown, the collection cannot be so complete as to possess much value for the visitor who wishes to study the progress and present state of these industries in this country.

To supplement this necessarily incomplete showing of products, the publisher of *The Iron Age* will exhibit a LIBRARY OF AMERICAN Books of interest and value relating to mining, the treatment and reduction of ores; the manufacture of Iron, Steel and other metals of commerce; the processes by which these metals are worked into useful forms; the nature, excellence and variety of American goods composed wholly or in part of metal; and price lists showing their cost, from which comparisons may be made with similar products of other countries.

The library will consist of the following departments:

### I.—GEOLOGY AND MINERALOGY.

Reports of Geological Surveys of States and Territories.

Reports of Surveys of Private Tracts and Sections of Country developed by Railroads.

Maps and Charts showing the Mineral Wealth of different sections of the United States.

American Metallurgical Text Books and Works of Reference.

Standard American Works on Mining, Assaying, &c.

We shall be under obligations to any one who may assist us in making this collection complete, as it will undoubtedly possess great practical interest and value, and attract much attention to the vast and varied mineral resources of the United States.

### II.—METALLURGY.

Standard American Works relating to the Metallurgy of Iron, Steel, Gold, Silver, Copper, Lead, Zinc, &c.

Drawings, Plans, Photographs or other Illustrations of American Metallurgical Establishments, Processes and Plant.

Papers on Metallurgical Subjects read before Scientific Societies or published in pamphlet form.

It is our intention that this department shall embrace everything of value which can be procured. Metallurgists and metallurgical chemists who have privately printed suitable papers will confer a favor by sending us copies without delay, that they may be properly classified and catalogued.

### III.—MECHANICS AND METAL WORKING.

Standard American Works on Steam and Railroad Engineering, Machine Building, Tools, Implements, &c.

Catalogues and Price Lists of American Engine Builders, Machine Tool Makers, &c.

Photographs, Drawings and other Illustrations of American Machines.

Standard American Works relating to Processes in the Manufacture of Metal Goods of all kinds.

Photographs, Drawings or other Illustrations of American Factories of Metal Goods.

In making this department complete, we shall need the generous assistance of every manufacturer of metal wares.

### IV.—HARDWARE, AGRICULTURAL IMPLEMENTS, STOVES AND MANUFACTURES OF METALS IN GENERAL.

Catalogues and Price Lists of American Hardware.

Catalogues and Price Lists of American Agricultural Implements.

Catalogues and Price Lists of American Stoves, Furnaces and Heating Apparatus.

Catalogues and Price Lists of other American Metal Wares.

This collection of catalogues and price lists will be one of the most interesting features of the whole exhibit; and in the present state of feeling abroad in regard to American products, will be sure to attract great attention from all persons interested in metal goods. *All manufacturers are earnestly requested to send at once copies of all their price lists, catalogues, circulars, &c.* We would be pleased to have this department include every printed document in the trade.

Beside the items above specified, we shall accept anything suitable for exhibition in connection with books and illustrations; but our space will not permit us to show samples of ores, metals or manufactured articles.

We desire it to be understood that no charge will be made under any form or pretext for exhibiting any book or other document, or for any services, the object being to present a collection of books, &c., which shall show the position of the United States in the metal producing and manufacturing branches of industry and attract the attention and excite the interest of foreigners.

The exhibit will be under the personal supervision of Mr. David Williams, publisher of *The Iron Age*, *The Metallurgical Review* and *The Metal Worker*, who intends to remain in Paris during the entire term of the Exposition—May 1 to Oct. 31—to direct the execution of a plan for the extensive circulation of these periodicals through all the countries represented in the Exhibition, especially those with which we have commercial relations of increasing importance. He will be assisted by competent persons speaking different languages, who will afford foreigners every opportunity of informing themselves as to the state of the metal working industries in America.

Letters and other mail matter for American visitors may be sent to our care, and every facility and convenience will be afforded those who may wish to make our exhibit their headquarters.

To avoid any misunderstanding, we would state that we cannot undertake the distribution of any printed matter, nor advance in any special way the interests of particular concerns. The exhibit is intended to represent impartially the whole trade, and no individual interests can be allowed to interfere with this object.

*Persons having books, catalogues, drawings, photographs, maps, or other illustrations suitable for classification in this exhibit, are requested to send them without further invitation, owing to the shortness of the time remaining for completing the work of collection and classification.*

Address DAVID WILLIAMS, Publisher, 83 Reade Street, New York.

## INDUSTRIAL ITEMS.

## MASSACHUSETTS.

The Taunton Locomotive Mfg. Co. have contracted to build ten heavy freight engines for the Union Pacific Railroad, to be delivered July 1 next. They are to be ten-wheeled, with 18 by 24 inch cylinders and driving wheels 5 feet in diameter. In consequence of this large order, the works of the company, which have done little or nothing the past two years, will at once start up in nearly their full capacity, giving employment to some 300 men.

S. S. Putnam & Co., nail manufacturers, of Neponset, have been succeeded by a corporation styled the Putnam Nail Company. The amount of the capital stock is \$300,000, which is all subscribed for, the stockholders being mostly Boston and New York parties. The following list of directors have been chosen: John S. Fogg, S. S. Putnam, C. A. Torrey, W. W. Whitmarsh, George F. King, W. S. Packer, John Mears, John H. Buttrick and B. F. White. B. F. White was elected president; John S. Fogg, vice-president; W. W. Whitmarsh, treasurer, and John Mears, clerk. The company is to continue the manufacture of horseshoe nails under the patents formerly held by S. S. Putnam & Co. and now owned by the new company.

The first eight-wheel freight cars used in this country were built in Attleboro before 1840. A car company was formed and carried on business in a large wooden factory near the railroad, subsequently adapted to other purposes and since burned. After the abandonment of car building, the factory stood vacant until 1853, when steam power was introduced, and it was then used for other manufacturing purposes and became the foundation of the present large manufacturing business of Attleboro.

The Franconia Iron and Steel Company, which have been shut down for a short time, taking account of stock, have resumed operations. Five schooners are on the way to or have arrived at Wareham with cargoes for these works. Three have coal and two pig iron.

Reports are current that the old Glen Charlie Works at Wareham are to be overhauled and put in order in connection with the Agawam Iron Works.

The Douglas Ax Company, of East Douglas, will send a large and elegant case of edge tools to the Paris Exposition.

The Bay State Rolling Mills at South Boston, which once employed 500 to 700 men, but for two or three years past have been running only 75 or 100, have now shut down entirely. There is some talk of a new company to take hold of the concern.

The mammoth 12-inch rifle gun which was cast at the South Boston Iron Works last May, has been finished. It weighs 50 tons and is to be taken to New Jersey to be tested.

The New England Glass Works at East Cambridge have decided to give it up. Their establishment has been finally closed, and the hundreds of workmen who have found employment there must seek work elsewhere. Many have gone to the vicinity of Pittsburgh, Pa., to seek engagements with the large glass companies there. Some of the workmen who have found themselves adrift have been employed in the New England Works during the most of their lifetime. The stock of the company at times has been at a very high figure, and the closing will be a severe blow to the industries of East Cambridge.

## CONNECTICUT.

The Plume & Attwood Company, of Thomaston, are running their brass mill only five days a week.

Manufacturing operations were commenced by Tuttle & Whittemore, of Union City, at the malleable iron foundry in Bridgeport, on the 1st inst.

The bell manufacturers of East Hampton say the snow comes too late to help them much this season. Goods are sold so cheap that there is no money in the bell business as generally conducted. The firm making money is the gong bell company, who do not manufacture maul, sleigh bells. Their business is mostly at present in toy bells, and this fall and winter till January 1st they have been doing a very large business, large orders being sent to foreign countries.

## NEW YORK.

The Albany Iron Works have shut down. The Rensselaer Rail Mill and Burdens' Steam Mill at Troy are running as usual.

## NEW JERSEY.

The Trenton Iron and Steel Works are employing some 250 hands, principally on special grades of wire.

## PENNSYLVANIA.

The Moselem Furnace is turning out a splendid quality of iron. The limestone used at the furnace is being hauled by teams from the quarries of Benjamin Peter, in Maiden-creek township. J. B. Brown has been awarded the contract for quarrying limestone for the Moselem Furnace. Operations at the Moselem ore mines stopped for several days to make repairs to the machinery.

The iron mines about Flourtown present a very busy aspect. All of them are being operated, and business is brightening up generally.

A Pottsville dispatch says that after several months of search, and many discouragements, the Philadelphia and Reading Coal and Iron Company have had the good fortune to strike the mammoth vein at the East Colliery, near Ashland. The vein, as found, is 21 feet thick, and there is every promise that it will be much thicker. The coal is of excellent quality.

The Warwick Furnace is making 52 tons a day.

At the shops of the P. & R. Railroad Company, Reading, a number of new locomotives are being built, the boilers of several of which are already on the frames. There are three kinds—two passenger engines, two coal-dirt burners, and several six-wheelers to be used as "pushers." The repairing of locomotives is first attended to, and whatever time is left is devoted to the new engines.

The Crane Iron Co. is blowing out No. 3 furnace, which is in need of repairs. It has not been in operation long, but is not working satisfactorily, and will be relined.

The Westernman Iron Works opened up

AMERICAN SCREW CO.,  
Providence, R. I.

Manufacturers of

IMPROVED  
Gimlet Pointed Wood Screws,  
Patented

May 30,

1876.

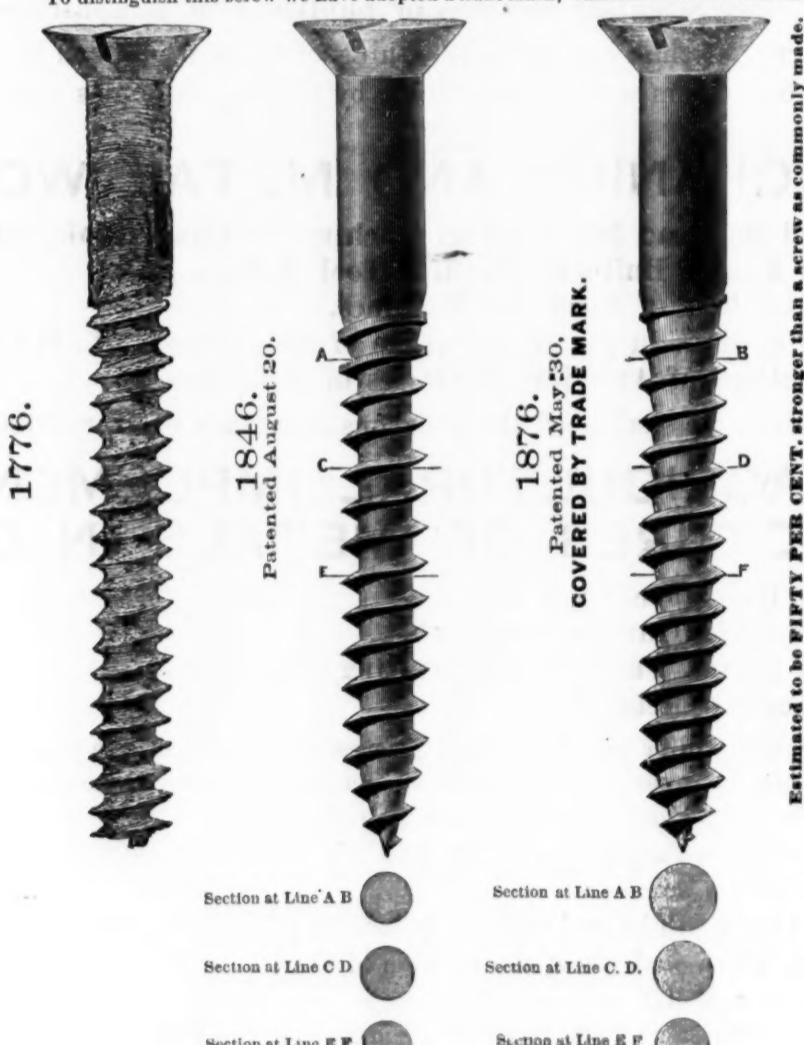


After forty years' experience we offer to the trade our **Centennial Screw**, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the **Improved** article only. To introduce them, they will be sold at same price as the old style screw.

The new screws will be packed in manila colored **boxes** with new label covering end of box, and **enlarged figures** showing plainly contents.

To distinguish this screw we have adopted a trade mark, which is also secured to us.



The above drawings show the progress of making screw from the old **blunt point** to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our **new screw** that not only is the sharp angle avoided, but the strength very much increased, as illustrated above. See sections at lines.

## CLAIM.

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

the new year with puddle, hoop, guide and bar mill double turn. Nail factory off, as per agreement; their time is up, and it goes on Monday of the present week. This firm closed the year a good deal behind their orders, notwithstanding their steady running, and not a ton of unsold stock is in their warehouse. The new mill started off double turn on the puddle, guide and the new hoop mills; old hoop mill and nail factory off (it starts the present week also); bar mill single turn. Don't suppose there is much stock in the warehouse. At the Stewart Iron Works the bloom mill began the new year, like the others, pegging away. Nothing special from any of the blast furnaces, only as a general summary. There are in Sharon, in the first week of 1878, four blast furnaces and three rolling mills in successful operation. From Middlesex we hear of nothing which looks like starting the mill. The sample lot of iron gave good satisfaction in everything, but the men won't go on in the contract system.—*Sharon Herald*, Jan. 11.

## PITTSBURGH AND VINCENNES.

Seven hundred and fifty men are said to be employed at the Keystone Bridge Works, filling a contract for material for the New York Elevated Railway and making bridges to supply those swept away by the recent flood in Virginia.

The Du Pu process for the manufacture of iron direct from the ore, is being tried commercially at the Crescent Steel Works of Miller, Metcalf & Parkin, in the new forge we have already noticed. The result sought is the manufacture of blooms for remelting.

Mr. James Cuddy, the oil tank builder, of Pittsburgh, is now engaged in the construction of three mammoth tanks at Montclair, N. J., which, it is said, will be the largest in the world. They are to be 90 feet in diameter, 30 feet deep, and each will have a capacity of 36,000 barrels. The next largest tanks in existence are two in this city, each of which has a capacity of 26,000 barrels.

A. Bradley & Co. have removed to their new building at Etna, Twelfth and Pike streets, two squares from the Union Depot.

The Edgar Thomson Steel Works commenced work on Monday with 550 men. The works stopped about a month ago for repairs.

The first run of coal for the year down the Ohio from this port is as follows:

For Cincinnati.....	1,981,000
For Louisville.....	4,604,000

Total.....6,585,000

Carnegie Bros. & Co., Union Iron Mills, are making rolls to roll the 6x6 feet angle iron called for by the specifications of the Elevated Railroad. They have orders for 3000 tons of iron for this work.

The affairs of Evans, Dalzell & Company, Pittsburgh, who we reported in an embarrassed condition some time ago, have been under consideration by their creditors with a view of making arrangements by which the evils of proceedings in bankruptcy might be averted. An arrangement was consummated to-day by which the affairs of the firm will be settled. The terms of the arrangement are not definitely announced, but we are informed that they comprise the transfer of the works of the firm to the creditors, who will operate them hereafter, under a limited liability partnership, probably as the Crescent Tube Works, Limited.

## WEST VIRGINIA.

The Whittaker Mill, Wheeling, shut down last week for repairs, and will probably be idle for several weeks to come. The furnaces are to be rebuilt.

The La Belle Mill, at Wheeling, is the only one in operation. Until further orders it will run but five days a week.

## OHIO.

The Lawrence Mill, Ironton, is running yet, and will run until the 18th of this month, when it will stop for stock taking.

The Etna Iron Works Co., Ironton, have been receiving a large quantity of iron Mountain ore.

It is reported that the Monitor Furnace, Ironton, will be blown in.

The Ravenna Glass Works are again in operation.

A strike among the employees of the Hubbard Rolling Mill is threatened.

The stockholders of the Jefferson Iron Works, Steubenville, held a meeting recently and elected the following board of directors: David Spaulding, Calvin Doty, S. H. Woodward, John McClinton, Wm. R. E. Elliot, John Wright, Wm. Dean. The old officers were re-elected. A resolution to reduce the capital stock of the company from \$800,000 to \$600,000 was voted down.

The Belmont Glass Works, at Bellaire, in their January statement of the business of the year 1877, make a good showing. Their sales aggregated \$121,000. The new directors, elected on Wednesday, are as follows: J. Armstrong, George Hoge, L. C. Stifel, Jacob Wise, John Crummel, James Gill and James Booth.

The Alice Furnace of the Etna Iron Works made 2171 tons of iron (all No. 1 except 38 tons) in the month from Dec. 7, 1877, to Jan. 7, 1878, both inclusive.

The Howard Furnace is running up her stock and proposes to wind up.

The Buckhorn Furnace, making 10 tons of cold blast iron per 24 hours, will blow out this week.

The Pine Grove Furnace, which claims a daily make of 17 tons of iron, is blowing out. The Pine Grove and Lawrence furnaces are cutting large quantities of wood and otherwise preparing to make big blasts this year.

The Hecla I. and M. Co. are cutting wood for the coming summer's cooling. The furnace, which is now running, will finish the present blast on or about 1st of March.

Messrs. Cartwright, McCurdy & Co. are running their works at Youngstown on full time. They are full of orders, although the prices are not large. There are 600 men at present employed.

The Niles Iron Works are idle, a large number of the men who had been working under the contract system having refused to do so longer.

The Martin's Ferry News says the La Belle Glass Works are so crowded with orders that they made no stop during the holidays,

B. KREISCHER & SON,  
New York Fire Brick &  
STATEN ISLAND  
CLAY RETORT WORKS,  
Established 1845.

Office, foot of Houston Street, East River,  
NEW YORK.

The largest stock of Fire Brick of all shapes and  
sizes on hand, and made to order at short notice.

Cupola Brick, for McKenzie Patent,  
and other Retorts, Ground Brick, Clay and  
Sand, Spelter Kilns for Rolling Mills and Foundries.  
Stone Ware and other Fire Clay and Sand,  
from my own mines at New Jersey and Staten Island,  
by the cargo or otherwise.

NEWTON & CO.,

Successors to  
PALMER, NEWTON & CO.,  
ALBANY, N. Y., Manufacturers

**FIRE BRICK**  
Stove Linings,  
Range and Heater Linings  
Cylinder Brick, &c., &c.

M. D. Valentine & Bro  
Manufacturers of

**FIRE BRICK**  
And Furnace Blocks  
DRAIN PIPE & LAND TILE.  
Woodbridge, - - - N. J.

A. HALL & SONS, Perth Amboy, N. J.

ESTABLISHED 1846.

HALL & SONS, Buffalo, N. Y.

ESTABLISHED 1866.

**FIRE BRICK**

of reliable quality for all purposes, manufactured o  
the best New Jersey Fire Clays. Also, Architectural  
Terra Cotta, Fire Clay, Fire Sand, Kaolin, Ground Fire  
Brick and Diamantine Building Brick.

Brooklyn Clay Retort  
AND  
**FIRE BRICK WORKS.**

Manufacturers of Clay Retorts, Fire Bricks, Ga  
House and other Cupola Brick, &c., & Divers in  
and Makers of Fire Clay and Fire Sand. Clay bank in  
Hurt's Creek, New Jersey. Manufactury: Van Dyke,  
Elizabeth, Richards and Partition Sts., Brooklyn, N. Y.  
Office No. 88 Van Dyke St.

**MANHATTAN FIRE BRICK**  
and Enamelled Clay Retort Works.

ADAM WEBER, Proprietor.  
Office, 633 E. 15th St., N. Y. Clay Retorts, Ra  
mend, and Makers of Cupola Brick, &c., & Divers in  
and Makers of Fire Clay and Fire Sand. Clay bank in  
Hurt's Creek, New Jersey. Manufactury: Van Dyke,  
Elizabeth, Richards and Partition Sts., Brooklyn, N. Y.  
Office No. 88 Van Dyke St.

**Watson Fire Brick Manufactory**  
ESTABLISHED 1836.

JOHN R. WATSON, Perth Amboy, New Jersey.  
Manufacturer of

**FIRE BRICK,**  
For Rolling Mills, Blast Furnaces, Foundries,  
Gas Works, Lime Kilns, Tanneries, Boiler  
and Grate Setting, Glass Works, &c.

FIRE CLAY, FIRE SAND, AND KAOLIN FOR SALE.

**HENRY MAURER,**  
Proprietor of the  
**Excelsior Fire Brick & Clay**

**Retort Works,**  
Manufacturer of FIRE BRICK, HOLLOW  
BRICK AND CLAY RETORTS.

WORKS: Perth Amboy, New Jersey  
Office & Depot: 418 to 422 East 23d St., N. Y.

**TROY FIRE BRICK WORKS**

Troy, N. Y.,  
JAMES OSTRANDER & SON,

Manufacturers of

**FIRE BRICK,**  
Tuyeres, Tiles, Blast Furnace Blocks, etc. Miners and  
Dealers in Woodbridge Fire Clay and Sand, and Staten  
Island Kaolin.

**Cumberland Fire Brick Works.**

GARDNER, STUART & CO.,

Manufacturers of

**STANDARD SAVAGE FIRE BRICK.**

OFFICE:

Room 3, No. 66½ Fourth Ave., Pittsburgh, Pa.

WORKS:

One mile from Mt. Savage Junction, Md., B. & O. R. R.

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**Eagle Plumbago Co.**

Crucible, Lubricating, Electrotyping, Stove

Polish, and other grades of

**PLUMBAGO,**

FOR SALE BY

CONGREVE & SANDERS, Sole Agents

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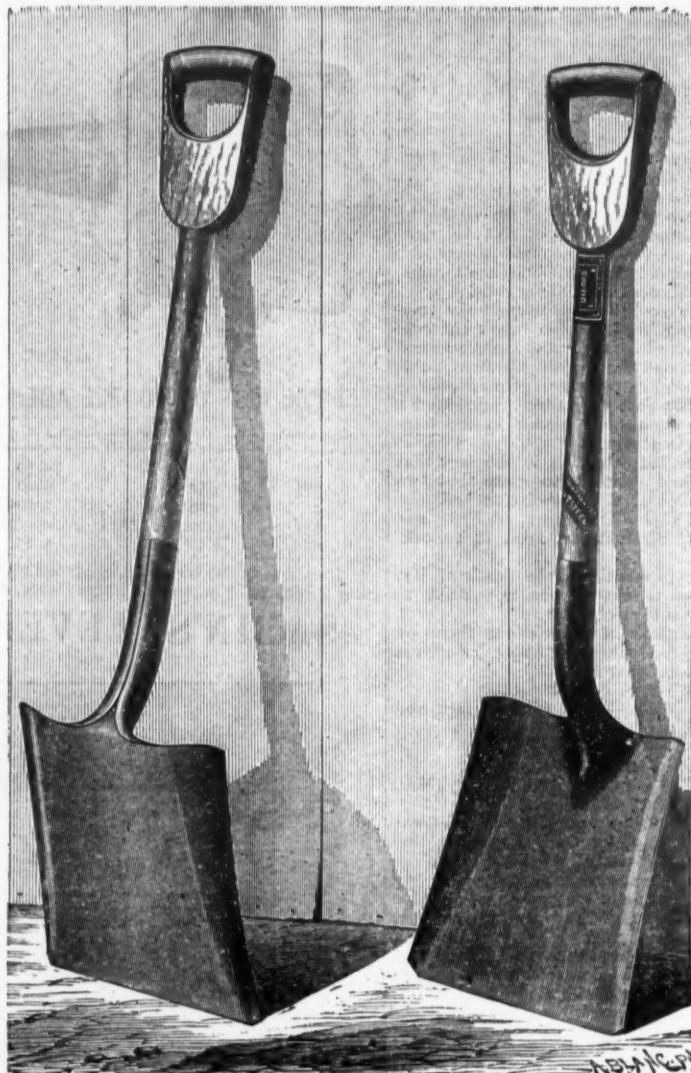
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## B. ROWLAND & CO.,

PHILADELPHIA.



## THE OXFORD PATENT WELDED Solid Cast Steel Shovel. OIL TEMPERED.

The Oxford Patent Welded Solid Cast Steel Shovel, as now furnished by us, is a new article of manufacture, of a single plate of Cast Steel, without rivets, welded by the Antrim process, with smooth surfaces front and back, and with socket continued some distance up the handle, completely encircling it in the manner of a ferrule, thus insuring a perfectly straight handle in every instance, and securing the qualities of absolute perfection of strength, and the greatest beauty of construction possible. Taken altogether, our methods will be found to obviate all the defects now so patent in all other Shovels, even those of first-class manufacture, and we will guarantee for them superior strength in parts usually the weakest, perfect symmetry and regularity of appearance, and wearing quality one-third greater than those of any other now made.

The same will apply to our Oxford Patent Welded Solid Cast Steel Spade and Long Handle Round Point Shovel in every respect.

## WARRANTED OXFORD CAST STEEL.

Goods of this stamp are made of the very best material, and are warranted. We will always replace them with new ones in every case where reasonable satisfaction is not given.

## B. ROWLAND & CO.,

CITY OFFICE,

27 North Fifth Street, Philadelphia, U. S. A.

Works at Frankford, Phila., U. S. A.

## TORRENCE & CO.,

No. 127 Walnut Street, Philadelphia, U. S. A.,

SOLE EXPORT AGENTS.

and the company will take stock while the works are in operation.

The Glencoe Iron Works—Arms, Bell & Co.—at Youngstown, are being run on full time, while having plenty of orders. Sixty hands are employed, the establishment having been enlarged to double its former capacity. More improvements will soon be effected. The goods made by the concern consist of nuts, washers, carriage tire, machine and railroad track bolts, and amount to about \$12,000 per month.

Morgan, Williams & Co., Alliance, have for some time been adding to their force of workmen. They have on hand, besides a large amount of general and special machinery of their manufacture, a five-ton steam hammer for the Edgar Thomson Steel Works, the hammer being, it is said, of a greatly improved design over those in general use.

### GEORGIA.

Zinc works are to be established near Concord, Lewis county, in the neighborhood of a rich deposit of that ore.

The Rising Fawn Furnace is making 30 to 40 tons per day. Contracts have been closed with the Dade and Tennessee coal companies to furnish all the coke necessary.

### TENNESSEE.

The Sewanee mines, at Tracy city, shipped during the year 1877, 2,598,777 bushels of coal and 1,070,328 bushels of coke; total of coal and coke, 3,669,105 bushels, making 12,022 car loads.

The Chattanooga Works have turned out nearly 400 tons of "steel iron," made from gray specular ore owned by the Roane Iron Company, near Cartersville, Ga. This pig will be used as a test, but in the new steel works now being erected by the Roane Company, and which will be completed probably in April. The iron is pronounced very excellent for purposes of steel manufacture by experienced persons.

The Vulcan Works at Chattanooga are now running 20 nail machines, and this number will be increased as trade may justify. Their nail product meets with ready sale.

D. Giles & Co., general founders of heavy castings, and manufacturers of cast pipe, Chattanooga, assigned for the benefit of their creditors last Saturday: liabilities, \$9000; assets, \$30,000, in very good property, principally unencumbered real estate. The business has been managed prudently, and nothing but the loss of confidence and extreme stringency of the money market could have forced the firm to this step. Matters have come to such a pass that a few small but importunate creditors can drive a manufacturer to madness or involuntary bankruptcy unless he has ready means of his own, for no one will advance money on property these times, and to pay bank rates as a steady business is to court ruin. This is the first important failure we have noted in the South in some time, but more will probably follow soon unless there is a financial change for the better.

### KENTUCKY.

The Charlotte Furnace has not been rented yet.

Hunnewell Furnace made a daily average of 20 1/4 tons of foundry iron last week.

Two thousand seven hundred tons of pig iron now await shipment at Riverton.

The Mt. Savage Furnace is chipping 7500 cords of wood this season, the Pennsylvania 6000 and the Hunnewell 20,000—at 30 cents per cord.

The Hunnewell Coal Mines stopped on Monday the 7th, on account of the ice in the Ohio River, which prevented them from shipping coal.

There were also several guests, and the press was well represented.

The President addressed the meeting as follows.

## National Association of Stove Manufacturers.

### THE ANNUAL MEETING.

The National Association of Stove Manufacturers met at the Metropolitan Hotel in this city, on Wednesday, January 16, at 12 M. President S. S. Jewett, of Buffalo, in the chair. The following gentlemen responded to the roll-call:

Thos. Jones, C. L. Merritt, of Foxell, Jones & Co., Auburn, N. Y.

D. G. Littlefield, Littlefield Stove Co., Albany, N. Y.

S. H. Ransom, Clarence Rathbone, Ransom Stove Works, Albany N. Y.

John F. Rathbone, Grange Sard, Jr., Rathbone, Sard & Co., Albany, N. Y.

S. S. Jewett, Josiah Jewett, Jewett & Root, Buffalo, N. Y.

H. S. Hubbell, A. S. Hubbell, Hubbell & Bro., Buffalo, N. Y.

Miles Pratt, Walker & Pratt Mfg Co., Boston, Mass.

John Magee, Albert L. Parlin, Magee Furnace Co., Boston, Mass.

E. P. Moragne, Geo. W. Elliott, Highland Foundry Co., Boston, Mass.

N. Brayer, Rochester, N. Y.

H. Cribben, Chicago, Ill.

W. H. Whitehead, Tibballs, Shirk & Whitehead, Chicago, Ill.

A. E. Chamberlain, Chamberlain & Co., Cincinnati, Ohio.

A. G. Patton, J. F. Murray, Columbus, Ohio.

Wm. H. Tefft, Detroit Stove Works, Detroit, Mich.

Geo. H. Barbour, M. B. Mills, Michigan Stove Co., Detroit, Mich.

B. M. Thomas, Detroit Iron and Brass Mfg. Co., Detroit, Mich.

Wm. P. Abendroth, John D. Fraser, Frank A. Abendroth, Abendroth Bros., New York.

Uriah Hill, Jr., P. B. Acker, Union Stove Works, New York.

Geo. W. Robertson, Southard, Robertson & Co., New York.

Henry T. Richardson, Richardson, Boynton & Co., New York.

Jordan L. Mott, Jordan L. Mott, Jr., Robt. Diven, J. L. Mott Iron Works, New York.

N. L. Ely, G. T. Burgess, New York.

D. D. Whedon, Jr., Munsell & Thompson Mfg. Co., New York.

W. Sanford, National Stove Works, New York.

Jas. H. Codding, Dighton Furnace Co., N. Dighton, N. Y.

Isaac A. Sheppard, I. A. Sheppard & Co., Philadelphia and Baltimore.

Samuel L. Utter, Chas. Noble & Co., Philadelphia, Pa.

J. H. Whitman, Cox, Whitman & Cox, Philadelphia, Pa.

Alex. Bradley, A. Bradley & Co., Pittsburgh, Pa.

C. W. Anschutz, H. Anschutz & Son, Pittsburgh, Pa.

J. J. Warren, Stamford Foundry Co., Stamford, Conn.

G. F. Filley, Excelsior Mfg. Co., St. Louis, Mo.

C. H. Buck, Buck's Stove Co., St. Louis, Mo.

G. C. Baldwin, Jr., Walter Clark, Eddy, Corsi & Co., Troy, N. Y.

Jos. W. Fuller, Walter P. Warren, Fuller, Warren & Co., Troy, N. Y.

S. T. Peckham, J. S. & M. Peckham, Utica, N. Y.

C. H. Senehey, Jos. Bell & Co., Wheeling, W. Va.

A report is going the rounds, credited to one of the directors, that the directors of the Republic Iron Company have recently declared a dividend of \$20 per share on the earnings of the past year. The statement grew out of the fact that a dividend of \$5 per share was recently declared payable from the surplus earnings of the years 1875-6. While it is probable that the company made something last year, it is altogether improbable that a balancing of the books will warrant any such dividend as that referred to.—*Mining Journal*.

We copy the following from the Marquette *Mining Journal* of the 12th: A project is on foot for the building of a new charcoal furnace in the Menominee iron range. It is doubtful, however, if the scheme can be consummated, in view of the present depressed state of the iron market. The Carp River Furnace is blowing again, the blast having been put on to day. While out the stack was thoroughly repaired, a new bell and hopper added, and she starts up again with the very best prospects for a long and successful run. The new engine for the Pioneer Furnace, built at the Iron Bay Foundry, this city, was shipped on Wednesday, and it is probable that the furnace, which has been banked for a week or ten days past, will commence blowing again to-day or to-morrow. Among the newest of the many new manufacturing enterprises of the enterprising city of Appleton, Wisconsin, are works for the manufacture of steel horse nails under a special English

court save that of reason. The safety and integrity of our national debt has been more fully established by the price paid for our bonds, and by the facility with which they are now being refunded at a very low rate of interest. The shadowy specter of Southern war claims has so far failed to become a substantial power, and probably never will be any more than a visionary scheme. The last great war issue, the restoration of specie payments, is now almost a question of the past. In spite of legislative tinkering we have arrived, practically, at specie payments. By reducing expenditures, by waiting for the natural growth of the population and by the constant increase of agricultural and mineral products, the nation now sees United States currency about to become as good as gold, and its credit better than ever before.

The war in the East still continues to exert an influence upon the trade of the world, which is not as beneficial as some merchants anticipated. Fabulous profits for our surplus provisions have not been fully realized. The contestants have no need of our agricultural products, in fact they have had a surplus to sell to other nations. Yet the idea of higher prices has so taken possession of producers as to induce them to hold for a rise, thus preventing the active circulation of an immense volume of money which should have enlivened the business of the past season.

The course of the stove trade, during the year 1877, has been more satisfactory than for many previous years. The volume of business has been greater, and this, in comparison with the reduced production, enables me to make the gratifying announcement that the stocks of stoves now on hand are undoubtedly less than at any time since our organization. The manufacturers have all wisely extended to their customers the full benefit of the reduced cost of the goods, so that the retailers also are no longer loaded down with high-priced stock. They are in a safe condition, prepared to buy carefully for legitimate wants, and better able to pay promptly for all they decide to buy.

The past harvest was indeed a bountiful one, of which the benefits are not all instantaneous, but will continue to be felt for a long time to come. The portion already marketed has had a decided effect upon sales and collections. The channels of trade have felt its influence and encouraged us to believe that the dawn of a permanent prosperity is at hand. With less stocks in existence; with dealers in an unusually healthy condition; with vast reserves of agricultural wealth, and with all raw materials at the lowest prices known for many years, there is a true basis established upon which future calculations can safely rest. As far as these facts are concerned, stove manufacturers may confidently expect to make their business profitable if they steadily adhere to the policy of watching their product carefully, and if they continue to offer goods to dealers at the lowest possible prices.

Permit me, however, to mention an evil (a growing one) which is not directly under our control, but may possibly receive a check from what can be said concerning it. It is the number of retailers to be found in every town. The extravagant profits which were made during the war period, enticed into the villages and cities hosts of persons who expected to better their condition by entering mercantile life. Hence, our trade, as well as others, finds in its retail ranks an immense number who not only prevent others from receiving a fair reward for their capital and labor, but are unable to get any profits for themselves. A great many good farmers have undoubtedly been spoiled without doing the least good to themselves or any one else.

It has been the policy of this organization to exclude from its meetings all motions or discussions having reference (however remote) to the element of labor. Not that it was a minor factor in the problems of the stove trade! Not because it was so small an item that it could be safely neglected! It was solely for the purpose of leaving the vital question of labor to individual manufacturers who are in direct contact with their men. They can consider more intelligently all the facts which guide them in deciding what they can afford to pay to all associated with them in business, in whatever department. The whole matter was thus left to be regulated by the natural laws of trade.

Up to the present time our determination has been a wise one, and, I trust, it will never be changed as far as the price of labor is concerned. Our remarkable record as an Association is largely due to the exclusion of the question of wages, and the future career of this national organization will not be crowned with success unless we steadily pursue the same line of policy. I deem it now my duty to call your attention to an interference with the natural course of labor, in which we are all deeply interested, not only as manufacturers but as fellow-laborers associated with our employees in the prosecution of a legitimate trade, upon which our mutual prosperity depends. I allude to the farming out of prison labor at 50 cents or less a day.

It is not my intention to enter into this subject in order to champion the interests of the manufacturers, although they employ a vast property (in money and real estate), upon which this interference may bring untold disaster. Strong and conclusive arguments can readily be suggested, all of which would be sufficiently convincing. But in their interest I desire simply to say that, if they are unable to arrange their business so as to conform to existing circumstances, it is in their power to withdraw their capital from this trade and make it remunerative by turning it into other and more productive channels. Such a sweeping change, while it is for the moment injurious to capital, and on that account a matter of regret, yet it is not so serious as the influence upon laborers in this trade, and through them upon all labor.

This farming out of prison labor at 50 cents or less a day, is advocated by the authorities in order to give the convicts employment, which is better for them while in prison and enables them to go out into the world with a knowledge of some trade, and with habits accustomed to work rather than to a predatory or solitary life. A leading motive, however, is that the scheme plants the prison upon a paying basis. Instead of conducting them at an actual loss, they are

to be forced to pay a profit. All of these motives are commendable, and no one of us would probably desire any other result. But let us for a moment estimate the effect of this system. Its recent establishment in various sections of the land in connection with our trade, was inspired (on the part of the manufacturers) by the desire to escape from the greater prices paid to outside laborers, and under the expectation of securing for each day's labor a return equally as good as heretofore. Whatever doubts may arise in regard to the realization of these desires and expectations relate entirely to the details of the work in a mechanical sense. Such imperfections competent manufacturers may possibly be able to overcome, which then brings to the front the competition of labor at 50 cents or less a day with greater prices now paid to outside labor.

Before the manufacturer is inclined to adopt such heroic treatment as I have intimated, and even before capitalists realize the risk of continuing to furnish money to a business in such a situation, every effort will first be made to enforce strict economy in every branch of manufacturing or selling.

Employers interested in honest labor will promptly watch all variations in prices of raw material. These resources exhausted, this unnatural competition will force occasional slight reductions in the price paid to labor of every grade. But, as time rolls on, it becomes a direct conflict between honest and dishonest labor. The laborer who is innocent of crime, after exhausting gradually the little reserve hoarded up during many years for a possible time of want, becomes dependent solely upon his meager earnings on the basis of prison contracts.

To look to other fields of mechanical life for sustenance, is only to make them still more overcrowded and to carry into their ranks the firebrand of prison prices. It is evident to you all that unmarried laborers could merely exist on such a pittance, and that those with families could not do even that. While industry and thrift are forced to go hand in hand with penury, want and suffering of various kinds, we are expected to look upon the outcast from society quietly enjoying clothing, bed and board provided by the power whose laws he has outraged; and also to gaze upon scheming contractors using the labor (farmed out to them for a "mere song") in order to become wealthy, no matter how terrible the result may be to legitimate industry.

Appeals to the laws or to the constituted authorities may be made persistently, and those who see the serious evil of this unnatural system may (and I confidently believe they do) constitute an immense majority of the citizens; yet their power shown in such appeals is not sure of accomplishing immediate results. Those who have introduced this injurious plan are so absorbed in its operation that they do not dream of any evil in it. Storms of argument would beat upon them in vain.

There is, however, a power which once aroused will surely come to the rescue, and seriously interfere with these iniquitous schemes. The working men all over the land, and as they feel the pressure of prison prices, will protect their own interests in the most direct manner. They will naturally refuse to buy any goods offered for sale with the imprint of the prison contractor; they will prefer the product of honest labor; they will avoid anything which bears the taint of crime. Their influence may be relied upon to spread the same sentiment among all their friends, and so prevail in all circles of life. This power alone can bring about an overthrow of this effort to place convict labor in direct competition with honest labor outside.

I will also allude to a point of more fearful import, which carries up to a higher moral plane. What may be a moral result of the struggle? Will not many be driven to crime? Will not large numbers become vicious and exasperated because the only trade they know is unable to pay them living wages? Thus all our prisons and reformatories may become so crowded as no longer to be able to hold the criminals which this unnatural system may have created. In the hope of giving employment, and so benefit a few criminals, are we not sowing seed which will produce a greater crop?

A State or a nation can well afford to lose a few paltry dollars in maintaining places of confinement for those whom the courts decide to be unsafe to associate with their fellow-men. A State or a nation cannot afford to sell the labor of convicts at a price so far below what can be honestly earned in the same trade elsewhere.

I bring this matter before you as a protest against this unnatural interference with the course of honest labor in our trade, and to urge you all to give the matter immediate attention, in order to guard yourselves from the injurious effects of it if it can be carried to a practical and successful issue.

Before we dismiss this brief review, let us place upon our Mortuary Record the name of one of the most prominent manufacturers in our line. To the honored names of Hudson E. Bridge, Daniel H. Mears and William Resor we must now add Gardner Chilson. Born in the town of Thompson, Conn., in 1804, he learned at an early age the trade of cabinet maker, and also worked some time at pattern making. From that department, which may be regarded as the foundation of the stove trade, he rapidly acquired ample skill and knowledge in all other branches, so that he was able to overcome the most serious obstacles. Mr. Chilson devoted his whole life to his business with such energy and ability that his name is known wherever our trade is established. He was at his store, in Boston, at 10 o'clock in the morning of November, 21, 1877, but died of congestion of the lungs three hours later, at his residence in Mansfield, 20 miles from Boston.

Mr. Chilson never allowed himself to be forced to confess that his goods were inferior by continually claiming that they were the cheapest. He knew that what is commonly styled the cheapest must be the poorest. So he planted himself firmly upon the ground that the best goods were in reality the cheapest. He asked a fair price for what he produced, and succeeded in convincing customers that they were worth all he asked and more profitable in the end. He never deviated from this policy, which drew to him the confidence of the people and made

the last years of his life a course of uninterrupted prosperity. A part of the fortune which it was his privilege to gain he has generously donated to religious purposes.

In closing these remarks, it now becomes my duty to return to you the office which it has pleased you to confer upon me three times in succession, and to thank you, most heartily, for having repeatedly bestowed upon me the highest honor in the gift of the trade. That all my opinions have uniformly met with your approval it is, perhaps, too much to assert; but I trust that they have been received by you in the same cordial spirit with which they have all been inspired. I have had constantly in view the permanent prosperity of the whole stove trade, "believing that a continuance of the association, embracing so much ability and so large an amount of capital, can accomplish much to the mutual advantage of consumers, dealers and manufacturers of

stoves."

The address was received with many expressions of approval.

The election of officers for the ensuing year being in order, Mr. Sard moved the appointment of a committee of five to make nominations. The chair named the following gentlemen: Messrs. Whitehead, Buck, Peckham and Filley, as such committee.

Mr. Hill moved the appointment of a committee to consider and report upon the subjects considered in the president's address. The chair named Messrs. Hill, Baldwin, Sard, Peckham and Filley, as such committee.

Mr. A. Bradley, Treasurer, presented a report showing a small balance in the treasury. It was accepted.

Mr. Hill called attention to the fact that the chair had omitted to state that two other members of the Association had died during the year—Mr. Wager, of Troy, and Mr. Pollock, of Montrose, Lent & Pollock, N. Y.

Mr. Baldwin mentioned the death of Mr. Church. A committee was appointed to prepare suitable resolutions.

The committee on nominations then reported the following gentlemen as officers for the ensuing year:

President.—S. S. Jewett.

Vice-Presidents.—A. E. Chamberlain and Miles Pratt.

Treasurer.—A. Bradley.

Secretary.—Josiah Jewett.

Board of Managers.—Messrs. Eddy, Hill, Whitehead, Pratt and Sheppard.

Mr. Jewett declined renomination, but was urged to accept by Gen. Rathbone and others, and the wish of the Association was expressed by a unanimous rising vote.

Mr. Jewett finally consented to consider the subject over night and give his decision in the morning.

Mr. Whitehead was then directed to cast the ballot for the Association, and the officers above named were declared elected.

Mr. Bradley then offered the following resolution:

Resolved, That we consider it the duty of all American manufacturers to bring into their consumption, as much as possible, home products, especially when they can procure them at a reduced cost and of equal quality compared with foreign. We therefore take pleasure, as an association of American manufacturers, in recommending to the use of stove makers throughout the country American planished iron, at the same time complimenting the manufacturers (W. D. Wood & Co., Pittsburgh, Pa.) upon their success in producing an article of such good quality and beauty of finish. Adopted.

The question of discontinuing the semi-annual meeting was then raised and discussed at considerable length. The result was an expression of opinion on the part of the Association that two meetings in a year were better than one. It was, however, moved and carried that the president be relieved of the duty of preparing two addresses and the secretary of preparing two volumes for publication.

The question of prison labor contracts was then discussed at length and many gentlemen gave their views on the subject. On motion of Mr. Sard the chair was directed to appoint a committee to consider the subject and report to the Association.

The meeting then adjourned until 10.30 a.m. to-morrow.

After adjournment the Association were entertained with a lunch in the dining room of the hotel.



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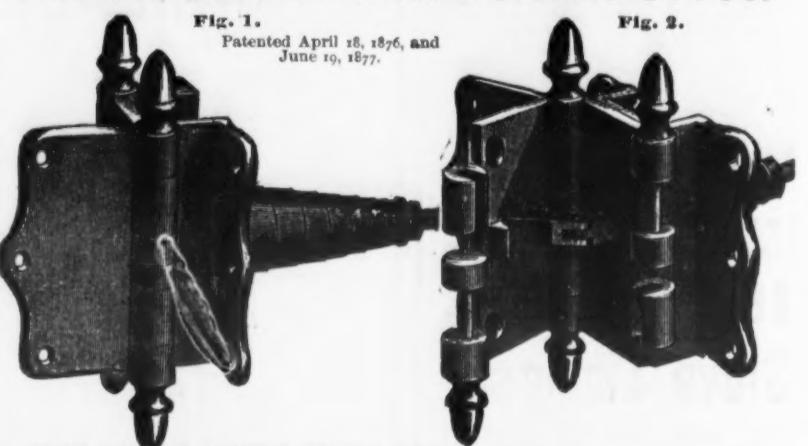
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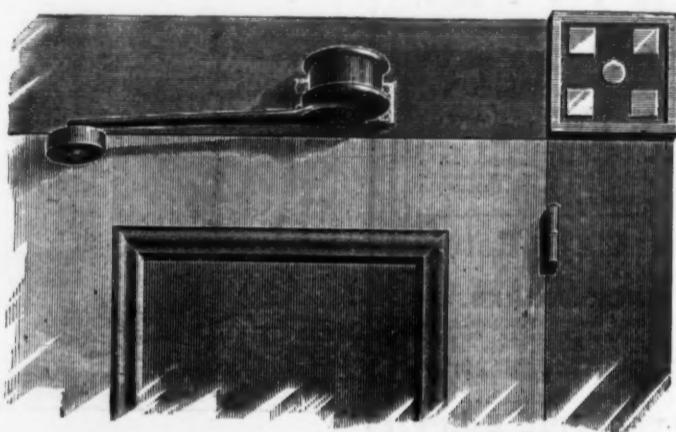


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3 1/2	1 1/8 to 1 3/8 "		3.00	6	2 3/8 to 2 3/4 "		7.50
4	1 3/8 to 1 3/4 "		3.50	6 1/2	2 3/8 to 2 3/4 "		9.00
4 1/2	1 3/8 to 1 3/4 "		4.25	7	3 "		10.50
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- 5th. It closes a door perfectly if only opened a few inches—and is more desirable—as the wider the door is opened, the less pressure is had upon the door.
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The advantages of this spring over all other cheap springs are its superior elasticity, being coiled from flat steel, and not as rigid in its action, or as liable to set in operation.

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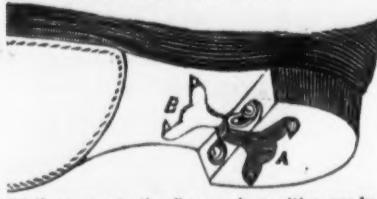
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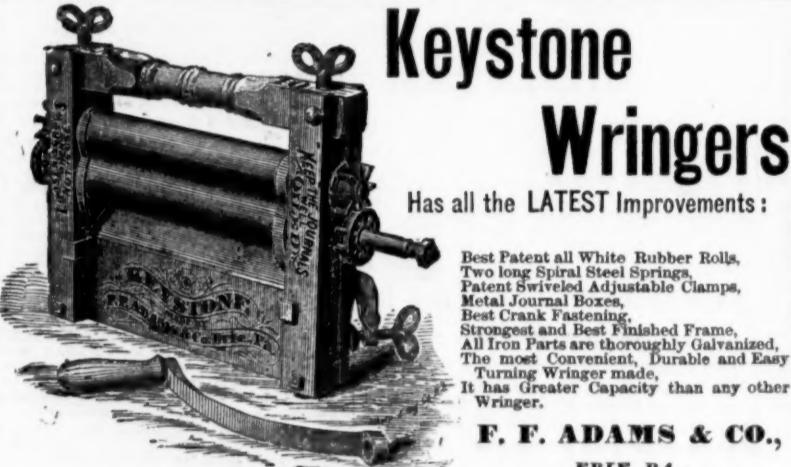
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## Commercial Movements in the South.

Some interesting experiments have been made this fall and winter by mercantile parties in Tennessee and Georgia, to test the feasibility of shipping grain, flour and other products of the Southern interior direct to Europe and to the West Indies. Several cargoes of grain and flour have been sent out in charge of agents to Liverpool, and one or more to Havana, made up of railroad shipments direct from Nashville. These ventures have been in the nature of trials. Transportation in each case has been reduced to its lowest terms, and all expenses attending these movements have been closely looked to by the gentlemen having the experiments in charge. So satisfactory has been the general result that a combined effort to establish a regular line of trade between the interior cities of Tennessee and Georgia and the port of Havana, is now in process of being worked out. On Saturday of last week delegations from the various commercial bodies of Nashville, Memphis, Chattanooga, Knoxville and Atlanta took care for Savannah, Ga., whence they sailed on Tuesday of this week for Havana, where they expect to remain a week or longer, inspecting the commercial condition of that city, and settling the preliminaries for closer relations between their respective cities and the island of Cuba. The delegations consist of some of the wealthiest and most enterprising men of the South, who represent almost every line of trade, manufacturing, mining, &c. Some of them have closely observed the movement, and the fact that they so far lend it countenance as to interest themselves in its further prosecution, is an earnest of final success. One of the proprietors of the line of steamers which takes the excursionists over to Cuba, took the trouble to go to Nashville and other points mentioned to make arrangements for the trip, another sign that there is some thing practical to be developed by the project.

If it shall prove successful, the principal immediate beneficiaries will be Chattanooga and Nashville. The former controls the grain products, and is the iron manufacturing, lumber making and general entrepot for the product and wares of the upper Tennessee Valley. Cheap transport to the seaboard, and regular connections there to Cuba, would help her grain market immensely and greatly stimulate production. It would also stimulate some lines of manufactures. Nashville, being on the border of the northern grain belt, and surrounded by a fine wheat and corn producing region, will also be greatly benefited by this new mercantile connection, if it shall prove a success.

**The German Iron Trade.**—The German Association of Iron and Steel Manufacturers have held a meeting at Leipsic. It was numerously attended by representatives from all parts of the Empire. German commercial policy was discussed, and the general opinion was that notwithstanding the prolongation of the existing treaty with Austria, the prospects of an ultimate favorable conclusion were almost hopeless. The Association resolved that the expectations in favor of free trade, based on the proposed new treaty with Austria, having proved delusive, it is necessary for Germany, in consideration of her suffering iron industries, to reimpose duties on iron, iron goods, and machines at the earliest possible date. A scale of tariffs prepared by a commission specially appointed for the purpose was submitted, and approved with slight modifications. The new scale embodied a duty of 33 pf. per German cwt. on pig iron, and the reintroduction of most of the duties for iron goods and machines abolished on December 31 last year. In a few instances these duties were enhanced and in some reduced. It was resolved to forward the recommendations of the meeting, including the proposed scale of duties, to the Chancellory.

**Coal Shipments on the Monongahela River.**—From the report of the Monongahela Navigation Co., we take the following extract as to the coal trade on that river. The total number of clearances issued during the year were 8,483, of which 5,504 were westward and 2,979 eastward. The increase on tons on coal and coke over last year was \$10,745.90. The total shipments of coal during the year were as follows:

Pool No. 1	12,458,700
" No. 2	34,751,100
" No. 3	11,051,800
" No. 4	14,430,200

Total ..... 72,702,800  
The shipments of coke aggregated 6,775,118, showing an increase on coal and coke of 10,999,918 bushels.

A Cleveland paper tells of the venture now being made to remove the hull of the steamer Great Republic from the river at St. Louis. The stern lies in about 40 feet of water and the bow on shore. Divers go down into the hull and scrape the mud from off the bottom planks and then place a row of cartridges of Hercules powder entirely across the inside of the hull, cover them with mud, and explode them with an electric battery. The result of this is to cut off a section entirely across the hull, which is easily hauled out into the river and disposed of. About 12 feet sections are to be taken at a time, and by the valuable services of "Old Hercules" (the explosive in use) the remains of the once grand steamer are quickly, but not quietly, disappearing from sight.

## Special Notices.

## Price Book

for General Hardware.  
Half leather, \$10; full leather, \$12. Send for descriptive circular.

Letters from customers.  
Your book to hand. We think it will answer.  
Send us three months hence.

BUELL LAMBERTSON, 97 Chambers St., N. Y.

**RARE OPPORTUNITY.**—A NEW  
SALESMAN, well posted in the  
Steel business, to travel in Western States.  
Must be acquainted with the trade. Address, with  
references. STEEL SALESMAN.  
Office of The Iron Age, 83 Reade St., New York.

## Special Notices.

## Wanted.

A set of new or good second-hand Rolls and Dies, for rolling Carriage and Wagon Spring Plates; must be heavy enough to roll 3-inch plates. Address, stating lowest cash price, and where they may be seen.

WOOD, SMITH & CO.,  
Fort Plain, N. Y.

**TRAVELING SALESMAN.**—Wanted, a postman as traveling salesman for an Eastern hardware house or manufacturer, by a young man who has had several years' experience in traveling and soliciting orders from the Western trade. Unexceptionable references given. Address, SOLICITOR,

Care Wheeling Post Office, Wheeling, W. Va.

**WANTED.**—Salesman well posted in hardware and house furnishing trade of New York and vicinity, wishes a line of goods to sell on commission. Address, H. C. W.,  
Office of The Iron Age, 83 Reade St., N. Y.

Export of Goods of American Manufacture to Continental Markets.

A gentleman, member of an old established New York firm, sailing for the Continent early in March, will make arrangements with American manufacturers for the introduction and sale of their goods in the European markets. Address, immediately with particulars. "EXPORT."

Care CHAS. E. WENDT, No. 4 Centre St., N. Y.

**AUCTION NOTICE FOR 1878.**

**Bissell & Welles.**  
WHOLESALE AUCTIONEERS AND COMMISSION MERCHANTS,

No. 15 Murray Street, New York,

Would solicit from manufacturers and importers consignments of Hardware, Cutlery and House Furnishing Goods for their Spring Auction Sales, and are prepared to extend every facility for the disposing of surplus stocks for immediate cash. Having had long experience in the thorough knowledge of all kinds of hardware, and our advertising extensive, our sales are largely attended by city and country buyers, making them unusually successful. We refer to the entire hardware trade of New York.

## Paris Exposition of 1878.

C. W. MAY, FIRNHABER & CO.,  
Commission Merchants,  
50 Boulevard Haussmann, Paris,

Agents for American Exhibitors.

For information and blanks apply to  
A. W. MORTON, 22 Platt St., New York.

Application for space may now be made.

**PARIS EXHIBITION OF 1878.**

The undersigned, who has been attached to the American Legation at Vienna, and has participated in the work of the Austrian Board of Commissioners at the Centennial, is desirous of making some further arrangements with first-class manufacturers in the United States for representation at the Paris Exposition of 1878. He has engaged to buy in this country during fifteen years, knows French and other leading languages thoroughly, and is strongly recommended by former exhibitors to Messrs. Fred. W. C. & Co., & Wilson, Messner, Ackermann & Co., Tiffany & Co. (Union Square), ALFRED EDWARD BUEK, 215 F. O., New York.

**PAUL HYAN, 15 Magazine Strasse,  
Berlin, Prussia.**

is desirous of assuming a few more agencies for German American manufacturers of repute. He is a general agent of German iron works, and begs to state that he is a man of standing, responsibility and long experience in architectural and manufacturing matters. During 20 years he has been proprietor of one of the largest and best equipped iron works in Berlin, and now owner of a commodious store, centrally located at Berlin, where he can exhibit goods and samples to advantage. Arrangements, if desired, may be made with him to have his constituent properties represented at the Paris Exposition of 1878. References: Messrs. Gardner & Co.; Messrs. Steinway & Sons, New York.

**CHARLES OTTO,**  
P. O. Box - - - 1199.  
(ESTABLISHED 1854.)

**Importer & Dealer in HARDWARE,  
Manufacturers' Agent, etc.**

19 & 20 Front and  
250 & 252 Market St., San Francisco.

I am prepared to make arrangements with Eastern manufacturers to act as their agent for the sale of Hardware, etc., on the Pacific Coast.

REFERENCES:  
Sargent & Co., 37 Chambers Street, New York.  
Van Wagoner & Williams, 26 Beekman St., N. Y.  
T. Hessenbruch & Co., 10 N. 5th St., Philadelphia.  
The Pennsylvania Tack Works, Norristown, Pa.  
The Pacific Bank, San Francisco.

JANUARY LIST.

MACHINE TOOLS,  
Second-Hand.

One 600 lb. Drop Hammer.  
One No. 1 Pratt & Whitney Screw Machine, with wire feed.

Two "Belden" Screw Machines.

Two Engine Lathes, 13 in. swing, 6 ft. bed.

Two Engine Lathes, 22 in. swing, 8 ft. bed.

One Engine Lathe, 76 in. swing, 36 ft. bed.

One Pratt & Whitney Lathe, 13 in. swing, 5 ft. bed, with taper attachment.

One Engine Lathe, 15 in. swing, 5 ft. bed.

One Engine Lathe, 22 in. swing, 16 ft. bed.

One Engine Lathe, 20 in. swing, 9 ft. bed. Two

Engine Lathes, 22 in. swing, 8 ft. bed. Six

Turning Lathes, 14 in. swing, 4½ ft. bed. Three

4-spindle Drills. One Brown & Sharpe Universal Milling Machine. One 6x8x90 ft. Planer. One 8 in. Shaper. One Gear Cutter. One "Bement" No. 2 Coffer and Key Seat Drill. One new "Hardaway" Bolt Heading Machine, to head up to ½ in. bolts. One new "Hardaway" Bolt Heading Machine, to head up to 1½ in. bolts. One 700 lb. Steam Hammer.

A lot of Wood Working Machinery.

Please specify which of the above tools you want and we will forward all particulars.

The above tools will be sold very low, and can be seen at

The George Place Machinery Agency,

121 Chambers and 103 Reade Sts., N. Y.

**WANTED.**—SALESMAN, well posted in the

Steel business, to travel in Western States.

Must be acquainted with the trade. Address, with references.

L. A. LAWTON, Herkimer, N. Y.

## Special Notices.

## DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

**Iron and Steel Drop Forgings**

In quantities to order at reasonable rates.

HERMANN BOKER & CO., Proprietors,

101 & 103 Duane St., N. Y.

**SPECIAL NOTICE.**

The undersigned offer their services as agents to

**American Producers of Metals.**

They represent foreign brands of

**Zinc, Russia Iron, Hoop Iron, Window Glass, Cutlery and Guns.**

LOUIS WINDMULLER & ROELKER,

90 Reade Street, N. Y.

**Attention.**

Dealers in Hardware, Iron and Steel, Coach Makers' and Blacksmiths' Supplies, Machine Tools, etc.

will add greatly to their interests to write for descriptive circular and discounts of the Improved "Eclipse" Fan Blower, for home and export trade.

It is cheaper, better and more durable than the bellows required on 12x20 inches floor space. See cut and

Address in The Iron Age of May 12, 1878.

Address EZRA F. LANDIS, Lancaster, Pa.

**For Sale.**

**TO ARRIVE.**

100 tons best blacksmith or forging coal. Delivered in two weeks in New York, below 13th street, or in

Jersey City or Hoboken. Address **COAL**,

Office of The Iron Age, 83 Reade St., N. Y.

**SPLENDID CHANCE.**

An old established stand, stock and good will of a

firm in central Illinois which is doing a prosperous

business. A rare chance for one who wishes to

engage in trade. Reasons of sale made known on

application. Address C.,

Office of The Iron Age, 83 Reade St., N. Y.

**Torrence & Co.**

**General Shipping & Commission**

**Merchants,**

127 Walnut Street, Philadelphia.

We are acting for a number of prominent manu-

facturers in finding a foreign market for their

goods, and would be pleased to correspond with

any parties who may desire to develop this trade.

## Important to Manufacturers of

## Builders' Hardware.

have just patented a valuable invention in

one line, being a combination of four things in

one article. Four distinct and separate features

patented. I desire to sell the patent or contract

with manufacturers and travel as salesman.

Address, for two weeks, D. L. L.,

Care Benton & Co., Meridian, Miss.

**MACHINERY WANTED.**

A Machine for making Boiler Rivets from ½ inch

to 1 inch; a Machine for making Hot Pressed

Nuts, from ¼ inch to ½ inch. Must be of best

make. Address particulars and cash price to

"IRON,"

Office of The Iron Age, 83 Reade St., N. Y.

**Notice of Removal.</b**

# Trade Report.

Office of THE IRON AGE,  
WEDNESDAY EVENING, JAN. 16, 1878.

Failures and rumors of failures have disturbed "the Street" more or less during the past week, though there have been no suspensions directly affecting the stock markets. The failure of E. J. Dunning, a prominent note broker, with liabilities in the neighborhood of a million dollars, took the money market by surprise and occasioned some distrust in mercantile paper, especially in the drug trade, to which Mr. Dunning's transactions chiefly related. His suspension was caused by his inability to meet the demands of the banks for call loans made to him on mercantile paper running from two to four months, and was followed by the failure of several of his customers, the largest being J. F. Henry, Curran & Co., and Downer & St. John. Late developments in connection with his affairs show a reckless method of transacting loans at the banks, and the suspicion has generally obtained that there are many firms floating more accommodation paper than is safe either for loaners or the mercantile interests.

The money market was tight early in the week with 1½% asked on call loans, but there has since been an easier tone and prime mercantile paper is quoted at 5% at the close, but is dull.

Growing confidence in the failure of the efforts to remonetize silver has had a good effect on gold and there has been a further reduction in the premium to 10½% as the lowest range of the week. The following table shows the daily range of the premium:

	Highest	Lowest
Thursday	10½%	10½%
Friday	10½%	10½%
Saturday	10½%	10½%
Monday	10½%	10½%
Tuesday	10½%	10½%
Wednesday	10½%	10½%

Governments have been firm, with fair transactions. State bonds are steady, with sales chiefly of Tennessees, Louisiana 7%, consols, Georgia 6s and Missouris. Railroad bonds are irregular, but generally show a slight advance.

The stock market has been rather irregular and somewhat unsettled. There has been some weakness in the active speculative shares, caused by the heavy "unloading" of a prominent speculator, who at the opening was understood to be a free buyer.

The Coal stocks were firm early in the week, but fell off a point on Tuesday, which has been gained by a rise to-day, the market being strengthened by the combination which the companies have formed. Its chief provision is to restrict the Anthracite product to 20,000,000 tons for the current year. This 20,000,000 tons is allotted to the different companies as follows:

	Yearly tonnage.
Philadelphia and Reading	5,725,000
Lehigh Valley	3,950,000
New Jersey Central Railroad	2,581,000
Delaware, Lackawanna and Western	2,550,000
Delaware and Hudson	2,496,000
Pennsylvania Railroad	1,525,000
Pennsylvania Coal Company	1,173,000
Total	30,000,000

The bank statement shows a gain in total reserve of \$2,077,700, made up of an increase of \$1,885,700 in the specie average and \$192,000 in the legal tender note average. The surplus reserve is \$10,980,700, an increase of \$1,656,575 over last week. The following is a comparison of the bank averages for the last two weeks:

	Jan. 5.	Jan. 12.	Differences.
Loans	\$2,077,700	\$2,077,700	Inc. \$6,979,167
Specie	25,077,500	27,002,800	Inc. 1,925,300
Legal tend'r	34,612,000	34,804,000	Inc. 192,000
Deposits	20,481,500	20,665,000	Inc. 1,684,500
Circulation	19,787,100	19,861,600	Inc. 74,500

The foreign trade movements for the week are shown in the following tables:

IMPORTS.		
For week ended Jan. 12:	1876.	1877.
Total for week.	\$8,880,000	\$6,407,867
Prev. reported.	7,528,519	5,259,709

Since Jan. 1. \$16,417,539 \$12,245,031 \$11,220,566

Included in the imports of general merchandise were articles valued as follows:

	Quantity.	Value.
Ansels	60	\$595
Brass goods	10	1,135
Bronzes	37	1,135
Chains and anchors	82	2,393
Copper	7,065	49,697
Cutlery	163	49,697
Guns	94	3,543
Hardware	13	1,245
Iron, pig, tons	150	2,327
Iron, pig, tons	3	306
Iron, other, tons	539	27,150
Metal goods	29	24,082
Needles	25	4,084
Platinia	1	662
Per. caps	20	4,690
Saddlery	5	775
Steel	1,158	27,144
Sterlings	67,022	2,933
Silverware	6	1,000
Tin, lbs.	34,532	13,861
Tin, 5,56 slabs	449,011	70,741
Wire	61	4,866
Zinc	66,756	3,250

EXPORTS, EXCLUSIVE OF SPECIE.

	1876.	1877.	1878.
Total for week.	\$5,050,091	\$6,407,867	\$5,098,167
Prev. reported.	4,028,328	3,981,539	6,477,544

Since Jan. 1. \$9,062,419 \$10,479,406 \$11,575,711

EXPORTS OF SPECIE.

	1876.	1877.	1878.
Total for week.	\$5,050,091	\$6,407,867	\$5,098,167
Previously reported.	4,028,328	3,981,539	6,477,544

For week ended Jan. 12:

	1876.	1877.	1878.
Total for week.	\$8,880,000	\$6,407,867	\$5,098,167
Previously reported.	7,528,519	5,259,709	6,477,544

For week ended Jan. 12:

	1876.	1877.	1878.
Total for week.	\$8,880,000	\$6,407,867	\$5,098,167
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	1876.	1877.	1878.
Total for week.	\$8,880,000	\$6,407,867	\$5,098,167
Previously reported.	7,528,519	5,259,709	6,477,544

For week ended Jan. 12:

	1876.	1877.	1878.
Total for week.	\$8,880,000</		

The purchasing prices offered by dealers for Old Metals are as follows:

Copper	per lb.	\$0.13	do	\$0.14
Yellow Metal	"	.09	do	...
Bronze, heavy	"	.08	do	...
Brass, light	"	.08	do	...
Composition, heavy	"	.11 1/2	do	...
Lead, solid	"	.02 1/2	do	...
Tea Lead	"	.02 1/2	do	...
Zinc	"	.13	do	...
Pewter, No. 1	"	.07	do	...
Pewter, No. 2	"	.05 1/2	do	...
Spelter	"	.05 1/2	do	...
Wrought Iron	per ton	17.00	do	...
Light do.	"	11.50	do	...
Stove Plate	"	9.50	do	...
Machinery do.	"	12.00	do	...
Grate Bars	"	5.00	do	...
Total		100.00		

The prices current for Rags, &c., are as follows:

Canvas, Linen	per lb.	4 1/2c.	do	5c.
" Cotton, No. 1	"	5 1/2c.	do	6c.
" No. 2	"	5 1/2c.	do	6c.
White, No. 1	"	4 1/2c.	do	5c.
No. 2	"	3 1/2c.	do	4c.
Second	"	2 1/2c.	do	3c.
Mixed, Woolen	"	5 1/2c.	do	6c.
Soft, do.	"	3 1/2c.	do	4c.
Gunny bagging	"	3 1/2c.	do	4c.
Jute bags	"	2 1/2c.	do	3c.
Kentucky bagging	"	3 1/2c.	do	4c.
Book Stock	"	2 1/2c.	do	3c.
News paper	"	1 1/2c.	do	2c.
Waste Paper and Scraps	"	1 1/2c.	do	2c.
Kentucky Hale Rose	"	4c.	do	5c.
Oakum Junk, No. 1	"	4 1/2c.	do	5c.
" No. 2	"	3 1/2c.	do	4c.
Tarred Shaking	"	3 1/2c.	do	4c.
Grass Rose	"	3 1/2c.	do	4c.

### EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending Jan. 15, 1878.

#### Hamburg.

Quan. Value.	Quan. Value.
Lea. belt, cs. 5 \$1.01	Gr'dstones, cs. 3 \$0.90
Sew. mach. cs. 278 9,600	Ge'ments, cs. 100 1.13
Spelter slabs, 2908 9,600	Copper, bbls. 167 45,600
Gr'd'sts, pgs. 7 75	Ag. imp. pkgs. 55 176
Lamps, pkgs. 3 142	
Mach'y, cs. ... 23 3,100	
Ironas, cs. ... 10 105	
Hdw. cs. ... 55 9,200	
Wringers, pkgs. 14 200	
Pumps, cs. 5 300	
Copper, bbls. 18 4,500	

#### Bremen.

Gas fixt., cs. ... 13 2,88	Sew. mach., cs. 123 3,473
Ag. imp., pkgs. 21 1,146	Gr'd'sts, pgs. 3 1,254
Clocks, cs. ... 6 336	Mach'y, pgs. 217 6,254
Hdw. cs. ... 11 470	Hdw., cs. ... 114 1,417
Wringers, pkgs. 14 200	Beltling, cs. ... 10 1,120
Pumps, cs. 5 300	Clocks, cs. ... 13 1,625

#### Liverpool.

Mach'y, cs. ... 25 5,606	Sew. mach., cs. 123 3,473
L'p'g'ds, cs. ... 33 2,162	Gr'd'sts, pgs. 3 1,254
Wringers, cs. ... 41 1,286	Mach'y, pgs. 217 6,254
Pumps, pkgs. 1 300	Hdw., cs. ... 114 1,417
Beltling, case	Brass g'ds, cs. ... 113
Hdw., cs. ... 11 470	Beltling, cs. ... 10 1,120
Wringers, pkgs. 14 200	Clocks, cs. ... 13 1,625
Pumps, cs. 5 300	Ag. imp., pgs. 6 410

#### Mayt.

Nails, kogs. ... 40 98	Revolvers, cs. 5 163
Le'd'bul'ts, kg. 10 69	Tacks, cs. ... 9 81
Cutterly, cs. ... 59 1,217	Le'd'bul'ts, kg. 10 69
Cartridges, cs. 29 2,408	Tacks, cs. ... 9 81
Windmills, ... 150	

#### United States of Columbia.

Mach'y, cs. ... 25 5,606	Revolvers, cs. 5 163
L'p'g'ds, cs. ... 33 2,162	Cartridges, cs. 29 2,408
Wringers, cs. ... 41 1,286	
Pumps, pkgs. 1 300	
Beltling, case	
Hdw., cs. ... 11 470	
Wringers, pkgs. 14 200	
Pumps, cs. 5 300	

#### Venezuela.

Mach'y, cs. ... 25 5,606	Revolvers, cs. 5 163
L'p'g'ds, cs. ... 33 2,162	Cartridges, cs. 29 2,408
Wringers, cs. ... 41 1,286	
Pumps, pkgs. 1 300	
Beltling, case	
Hdw., cs. ... 11 470	
Wringers, pkgs. 14 200	
Pumps, cs. 5 300	

#### Glasgow.

Mach'y, cs. ... 2 720	Sew. mach., cs. 123 3,473
Beltling, cs. ... 2 720	Gr'd'sts, pgs. 3 1,254
Burners, bxs. ... 6 420	Hdw., cs. ... 114 1,417
Rifles, cs. ... 1 350	Pistols, cs. ... 1 1,417
Bullets, cs. ... 1 350	W'ld' barrows, 24 1,320
Hdw., cs. ... 28 872	Ag. imp., pkgs. 14 396

#### Brasil.

Sew. mach., cs. 153 3,834	Revolvers, cs. 5 163
Brass g'ds, cs. ... 100 200	Tacks, cs. ... 9 81
Burners, cs. ... 10 200	Cutterly, cs. ... 3 1,217
Wringers, cs. ... 10 200	Cartridges, cs. 29 2,408
Pumps, cs. ... 10 200	

#### British West Indies.

Clocks, cs. ... 13 131	Sew. mach., cs. 153 3,834
Ag. imp., pkgs. 10 100	Gr'd'sts, pgs. 3 1,254
Nails, kogs. ... 34 54	Ironas, cs. ... 3 172
Mach'y, cs. ... 8 1,500	Pumps, cs. ... 8 396
Hdw., pkgs. 10 195	Beltling, bales. 2 318

#### Imports

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending January 15, 1878:

#### Hardware.

Benedict E.	Steel.
Cutterly, cs. ... 1	Packages, 2
Cases, cs. ... 1	Pratt, The & Son, &
Cases, cs. ... 2	Mds., pkgs. 13
Chains, oks. ... 50	Woodford W. O.
Drexel, Morgan & Co.	Cases, 23
Cutterly, cs. ...	

25¢ @ 25½¢; do. Sheathing, 20¢. Lead is weak and lower, and we again reduce our quotations. We quote: Pig, 4½¢ @ 4½¢, currency. For Domestic Sheet, 8¢; Pipe, 7½¢; Tin-Lined Pipe, 15¢; Bar Lead, 7¢; all of these, excepting Pig, are subject to the usual trade or 10 per cent. discount. Antimony is steady at 13¢, gold, for Boston spot lots, and Spelter is easy, closing at \$6 on the spot for 10-ton lots. Tin is dull and easy, and we again reduce our quotations. Singapore has declined to \$18.50. We quote: Straits, 15½¢ @ 16¢; Banca, 18¢ @ 18½¢; Refined English, 15½¢ @ 16¢, gold. We quote: Plates: Charcoal, I. C., \$6.50 @ \$7; Coke, \$5.75 @ \$6; and Terne, \$6 @ \$6.50, gold. —Commercial Bulletin.

## ST. LOUIS.

Specially reported by Messrs. SPOONER & COLLINS, Iron Commission Merchants, 217 North Third street, St. Louis, under date of Jan. 10: Our market is still in a quiet condition. Prices have not changed and stocks are very light. But few furnaces will run in this section during the year 1878, and as the demand is prospective to be much larger than last year, we see no reason why Red-Short Irons should not advance at an early day. None of our Stonecoal and Coke furnaces are running, and do not propose to start until the price of Iron will pay actual cost of production. We think 1000 tons will cover the entire stock of Missouri Stonecoal Irons now on hand in Missouri.

	No. 1.	No. 2.	Mill.	White and M't'd
Missouri Stone Coal	\$20.00	\$18.50	\$18.50	\$17.50
Missouri Charcoal	\$20.00	\$20.50	\$20.50	\$20.50
Tenn. Charcoal	\$20.50	\$20.50	\$20.50	\$20.50
South. Coke, soft and strong	\$20.00	\$21.00	\$10.00	\$18.00
Hang. Rock Charcoal	\$20.00	\$24.00	\$23.00	
Hang. Rock Charcoal, Cold-short	\$20.00			
Extra				
No. 1 I. M. O.	No. 1 A	No. 1 I. M. O.	No. 1 N. A.	Alie. Am. Scotch
Extra				
No. 1	No. 1	No. 1	No. 1	
Hang. Rock Charcoal, equal to Scotch.	\$25.00	\$24.00	\$24.50	\$23.50
Extra				
No. 1	No. 1	No. 1	No. 1	
West Va. Coke	\$20.50	\$23.00	\$22.00	\$21.50

COLD-BLAST CHARCOAL—All Numbers,				
Hanging Rock	4 mos.	\$25.00 @ 38.00		
Tennessee	4 mos.	\$26.00 @ 30.00		
Kentucky	4 mos.	\$26.00 @ 30.00		
Missouri	4 mos.	\$26.00 @ 30.00		
Georgia	4 mos.	\$26.00 @ 30.00		
Alabama	4 mos.	\$26.00 @ 30.00		
Assorted Bar Iron	2 mos.	\$2.00 @ 2.10		
No. 1 Railroad	100	\$1.90 @ 1.00		
Heavy Cast Scrap	100	\$1.65 @ 1.00		
Light	100	\$1.55 @ 1.00		
Old Rails	4 mos.	\$20.00 @ 20.50		
Old Car Wheels	4 mos.	\$16.00 @ 17.00		

## CHICAGO.

L. R. HULL & Co., 95 Washington street, under date of Jan. 14, report as follows: Demand in this market is very light. Business is about at a standstill, with indications that it will remain so for the balance of the month. Quotations unchanged:

LAKE SUPERIOR CHARCOAL				
	No. 1.	No. 2.	No. 3.	No. 4. and 5.
Lake Superior No. 1	\$24.00 @ 25.00			
"	\$23.00 @ 24.00			
"	\$23.00 @ 24.00			
"	\$23.00 @ 24.00			
"	\$23.00 @ 24.00			

AMERICAN SCOTCH.				
	No. 1.	No. 2.	No. 3.	No. 4.
Mahoning Valley, No. 1	24.00 @ 22.00			
" No. 2	23.00 @ 22.00			
Shawnee, No. 1	23.00 @ 22.00			
" No. 2	24.00 @ 22.00			
Jackson County, Ohio, No. 1	23.00 @ 22.00			
" No. 2	22.00 @ 22.00			
Silvery Gray	21.00 @ 22.00			

## LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Jan. 14, write us as follows: A fair demand for all grades of Iron continues, with few prices worthy of mention, although the market seems weaker than at last report. The usual time, 4 mos., is allowed on the quotations below:

FOUNDRY IRONS.				
	No. 1.	No. 2.	No. 3.	No. 4.
No. 1 Hanging Rock, Charcoal	\$28.00 @ 23.00			
No. 2	\$28.00 @ 23.00			
No. 1 Southern, Charcoal	\$28.00 @ 23.00			
No. 2	\$28.00 @ 23.00			
No. 1 Hanging Rock, Stonecoal and Coke	\$20.00 @ 22.00			
No. 2 Hanging Rock, Stonecoal and Coke	\$19.00 @ 20.00			
No. 1 Southern, Stonecoal and Coke	\$19.00 @ 20.00			
"	\$19.00 @ 22.00			
" American Scotch	\$20.00 @ 22.00			
White and Mottled, Cold-short and Neutral	\$14.00 @ 16.00			

CAR WHEEL AND MALLEABLE IRONS.				
	No. 1.	No. 2.	No. 3.	No. 4.
Hanging Rock, Cold-blast	\$34.00 @ 38.00			
Alabama and Georgia, Cold-blast	\$34.00 @ 38.00			
Kentucky, Cold-blast	\$25.00 @ 33.00			
"	\$25.00 @ 33.00			

SCOTCH IRON.				
	No. 1.	No. 2.	No. 3.	No. 4.
No. 1 Charcoal, Cold-short and Neutral	\$18.00 @ 19.00			
No. 2 Stonecoal and Coke, Cold-short and Neutral	\$17.00 @ 18.50			
No. 2 Stonecoal and Coke, Cold-short and Neutral	\$16.50 @ 17.00			
No. 1 Missouri and Indiana Red-short and Neutral	\$16.00 @ 22.00			
"	\$14.00 @ 16.00			

IRON.				
	No. 1.	No. 2.	No. 3.	No. 4.
No. 1 Hanging Rock, Charcoal	\$28.00 @ 23.00			
No. 2	\$28.00 @ 23.00			
No. 1 Southern, Charcoal	\$28.00 @ 23.00			
No. 2	\$28.00 @ 23.00			
No. 1 Hanging Rock, Stonecoal and Coke	\$20.00 @ 22.00			
No. 2 Hanging Rock, Stonecoal and Coke	\$19.00 @ 20.00			
No. 1 Southern, Stonecoal and Coke	\$19.00 @ 20.00			
"	\$19.00 @ 22.00			
" American Scotch	\$20.00 @ 22.00			

IRON.				
	No. 1.	No. 2.	No. 3.	No. 4.
No. 1 Hanging Rock, Charcoal	\$28.00 @ 23.00			
No. 2	\$28.00 @ 23.00			
No. 1 Southern, Charcoal	\$28.00 @ 23.00			
No. 2	\$28.00 @ 23.00			
No. 1 Hanging Rock, Stonecoal and Coke	\$20.00 @ 22.00			
No. 2 Hanging Rock, Stonecoal and Coke	\$19.00 @ 20.00			
No. 1 Southern, Stonecoal and Coke	\$19.00 @ 20.00			
"	\$19.00 @ 22.00			
" American Scotch	\$20.00 @ 22.00			

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of power and economy of labor. Immediately attached and allied to their Cleveland blast furnace by Messrs. Bolekow, Vaughan & Company, Limited, the pure molten iron direct from hematite furnaces is now converted into Bessemer steel, and almost without hand labor, but by most complete mechanical contrivance the steel passes from one stage of lifting, heating and rolling to another, until rails in 90 feet lengths are laid at the foot of the saw and cut into ordinary marketable conditions without waste of material. Sufficient arrangements are now almost in order for a make of 2000 tons of rails weekly, and it is expected that a rolling mill for steel ship plates will shortly follow. In the local manufactured iron trade the demand for ship plates and boiler plates has scarcely engaged more than one-half the producing power, although some works—the Stockton Malleable Iron Company, Limited, for instance—have been very fairly off for orders and specifications, although the strike of the men at the iron ship yards on the Clyde has interfered a good deal with the regularity of delivery. Some works, again, like the Moor Iron Works, Stockton, have added plate making and heavy joist and rolled girder iron, &c., to their rail trade, and during the last six months have been kept fairly employed."

## DURHAM IRON AND COAL TRADES.

The experience of the past year has not been at all satisfactory in the staple trades of this district. The decline of prices and of trade which was experienced for the two previous years has received a decided further downward movement, until capitalists declare that they never remember, all things considered, a time when there was so bad a return for money invested in the various sections of the great allied industries of iron and coal.

## NORTH OF ENGLAND STATISTICS

for the three months ending November 30th, are thus set forth in the usual periodical report of Mr. Waterhouse, the sworn auditor to the District Board of Arbitration, who certifies the average selling price of all classes of iron during that period to have been £6. 17/2s, as shown by these figures:

Description.	Weight in voiced.	Percent- age of Total.	Average net price per ton.
Tons, cwt, qr, lb.	£ s. d.		
Rails....	9,628 12 1 16	9.84	5 15 3.89
Plates....	51,439 16 0 3	59.60	5 15 8.75
Bars....	19,939 3 0 9	20.39	6 11 5.46
Angles....	10,797 3 0 10	17.17	6 9 9.33
Total....	97,864 14 2 10	100.00	6 10 7.50

In the quarter ending February, the average net selling price was £6. 18/3; in that ending May 31st, £6. 17/1; in that ending August 31st, £6. 15/1; and in the quarter just ended, £6. 10/7. In all descriptions of iron comprised in the return there has been a marked decline in price during the quarter. In August were £5. 10/10/4, plates £6. 10/4/2, bars £5. 14/8/2, angles £6. 7/1/1. There has been an increase in the November quarter of about 800 tons in the make of rails as compared with the quarter ending August; a decrease of 4500 tons in plates; an increase in bars of about 200 tons, and an increase in angles of 2000 tons; the total production during the quarter ending August being 99,286 tons, nearly 1500 tons more than in the November quarter. The largest tonnage was made during the May quarter, viz., 104,883 tons. The quantity for the quarter ending February was 94,664 tons.

## WEST RIDING IRON TRADE.

The demand for iron has been fairly good throughout the year at Bowling, but has slackened within the last two or three weeks. The best iron only is made at these works; large quantities have been exported from Bowling to the United States, and principally to New York. The duties on steel exports to the States being prohibitive, that trade has fallen away; the steel required in that country has been made there, and consequently none has been sent from Bowling, to the manifest disadvantage of the consumer on the other side of the water. Steel is about as low a price just now as ever was known, cast steel tires having gone down from £50 to £24 and £25. Some large N plates have been made during the year for marine boilers for Glasgow, and more than a dozen end plates, weighing 2000 lbs. each, have been manufactured at the works. Some interesting experiments have been made with dynamite to ascertain the strength of the boiler plates made at Bowling, and the results have been very satisfactory, as showing the great strength of the Bowling iron and its power to resist sudden shocks. The engineering department has been slack, and the men have had to be put on four days a week. The Bowling Company are going to considerable expense in preparing specimens of their manufactures for the Paris Exhibition. Wrought-iron girders from Belgium have been used for the cranes and other purposes in a new fitting shop erected at Bowling, these not being made at the works, and the price delivered was 10/- a ton lower than the same kind of girders could be bought from English makers.

## TRADES OF SHEFFIELD.

At the time of writing this week all the manufacturers are closed, and, for the time being, business has given place to holiday-making or the execution of alterations, repairs and extensions. At many of the iron and steel works new engines, boilers and mill plant, are being put down, mostly, however, by such large firms as have capital to spare for the purpose. It is not probable that any start will be made this week, seeing that there are not only the usual Christmas attractions, but also the annual winter fair, formerly held in November, and the still more powerful magnet of a pedestrian handicap. These combined drew a larger attendance of people into Sheffield on Wednesday than for two or three years past, the two railway companies alone bringing over 20,000 persons by special and ordinary trains. Taking advantage, therefore, of this practical cessation of business for the time being, we may the better look back upon the very eventful year which is now so rapidly drawing to a close, and may in a few sentences dispose of its chief commercial and trading features, so far as this locality

is concerned. We know that the iron trade proper has not been in a worse or more depressed state for many a long year, every branch of it having been utterly lethargic and unprofitable. Pig iron has decreased in value by fully 10/- per ton, a good Derbyshire brand being now readily obtainable at 50/- per ton, as against the 60/- current a year ago. Finished iron have been hit even more severely, for the common bars of the district are now sold at £5. 12/6 @ £5. 15/12, whereas they realized £6. 12/6 @ £6. 15/12 twelve months back. The better classes of manufactured iron and engineering qualities have not been exempt from the general decline in values, several of the brands best known to the engineering trade having gone down 20/- @ 30/- per ton. The Bessemer trade is now busy, but the greater part of the year has been very trying to those engaged in it, and even now the current activity is very largely owing to the depreciation in quotations, a good 80 lb or 83 lb rail being now but a trifle over £6 per ton, whereas at the commencement of 1877 at least 10/- @ £6. 7/10 ton more was asked. Many little economic processes have been adopted in the interval, however, and it is to them rather than to any real lowering of raw materials that the cheaper production is attributable. All other railway requisites have been neglected in a marked degree, and in the buffer, axle, tire and spring departments the work executed has been for the most part of a very meager description. In turning to the cast steel trade of the town—still one of our great staples—a very depressing prospect is opened out, and the present state of things unfortunately gives little hope of any early improvement. In no trade has there been a more keen competition of late than in this, and the general result has been that all the commoner and many of the medium kinds of steel have been irregularly reduced by at least 20% during the year.

The demand for wire, both of steel and iron, has of late grown to be considerable, and has been moderately strong in this locality for several months past. Iron wire is selling well for fencing, and—galvanized—for telegraph lines, while there is a decided steadiness in the more regular use of steel wire for cables, colliery winding ropes and bridge building purposes.

The file and saw industries have been anything but brisk during 1877, and the prospects of the latter cannot be pronounced to be of the most hopeful character, seeing that in this branch the American and French competition is yearly becoming more pronounced.

The United States makers are

admittedly turning out very good circulars

and cross-cuts, while our Gallic neighbors

use Sheffield steel, and make it up into fine

band and other saws which have a distinctive

reputation, and have so far distanced all

ordinary competition.

In agricultural implements or their cutting

parts, the trade is now quiet, owing to the

unfavorable harvest at home and the stoppage

of business with Russia and Eastern Europe.

The railway wagon builders have not been pressed with work, the call for new wagons having been to a great extent suspended by the bad state of the iron and coal trades. One or two concerns, however, have done tolerably well on renewals and repairs.

Of the coal and coke trades very little can

be said that would have the merit of novelty. In all directions the pits have been

very indifferently engaged all the summer and autumn, and even at the present time the market is very fully supplied. As a rule, prices are now somewhat below the

level of twelve months back, house coal

from 6/- @ 12/- per ton at the pits;

steam coal, 8/- @ 9/6; small fuel, 3/- @ 5/-

and gas contracts on the basis of 7/- @ 9/6 per ton at the pits' heads. North country coke now runs at 12/- @ 14/-, and local washed coke at much the same nominal price.

Reverting now to the affairs of the week, I may state that the directors of John Brown & Co., have declared an interim dividend at the rate of 4% per annum. The whole of the puddlers and other first-processes men of this company and of Charles Cannan & Co. have now been discharged, and, so far, nothing has been done by way of rearrangement, stock taking being now in progress. It seems probable that lower wages will be asked for, and a good many men discharged.

It is stated that Messrs. Steel, Tozer & Hampton, Limited, of the Phoenix Bessemer Steel Works, near Sheffield, have this year

made over 65,000 tons of ingots, from which 46,000 tons of steel rails have been rolled.

At this concern considerable additions and improvements are being made during the

vacation.

Various rumors having been circulated

that the Midland Railway Company have

purchased the Wolverhampton works of

Messrs. Thorneycroft & Co. for the purpose

of rolling their own rails, it may be stated

that these works have no Bessemer plant,

that they are out of the way of the main

lines of the company, and that those who

should be in a position to know about the

matter deny that the company have any

such intention. It would seem likely, in

fact, that the company could always buy

rails much more cheaply than they could

make them.

SOUTH STAFFORDSHIRE AND BIRMINGHAM.

The iron trade of these districts is unchanged, and now at a holiday standstill. There are now 43 furnaces in blast out of 150 built, six having just been blown out, viz.: two at Messrs. Glover's, at Longton; two of Lord Granville's, at Shelton, and two at Messrs. Goddard's Works. There are about 50,000 tons of pig iron in stock in the district. Prices are quiet at £5 @ £5. 10/- for best bars; £7, medium, and £6, common. Plates are £6. 5/- @ £6. 7/6, and sheets, £7. 5/- @ £11 for ordinary, and up to £20 for very best brands. Pig iron ranges from £2. 2/6 @ £3 per ton. In reviewing the year's hardware business the Birmingham Post says: "As regards particular industries, probably the most prosperous in 1877 have been the brass foundry and edge tool trades. The former has been sustained chiefly by the revival of the building trade and the impulse given by the educational movement to board school erectives in all parts of the country. The activity of the latter has been large-

ly referable to the Indian famine and the large requirements of the Indian government in road making tools, &c., for the relief works. Apart from this special and transitory cause of activity, the demand for cultivating tools for the sugar growing countries of South and Central America and the tea-planting districts of northern India, has been well sustained; and our edge-tool producers have been so busy in ministering to the wants of these markets that they have scarcely observed the danger which threatens them in Australia, Canada, and the Cape, where the American edge-tool makers are gradually displacing competitors. The gun trade has been throughout the year in a very languishing state, notwithstanding the war, and the only contracts of importance in the military department have been those undertaken for our own government. A fresh contract for 17,000 Martini-Henry rifles for the same customers was placed here a few weeks ago, together with a small one for the Cape. In the birding department business has been very depressed. The ammunition trade on the whole has been quiet, but contracts of considerable amount for the Turkish government have been under execution during the past half-year, and are still incomplete. The jewelry trade is slowly recovering from the extreme depression of the past two years, but the improvement is still slight and partial. In the iron tube and wire branch, business has been and still is seriously affected by foreign competition, but there is a little more doing of late in the cheaper descriptions of gas tubing. The lamp and chandelier trades have been far from active, though in these branches also business has been decided better of late. Metal rollers and brass wire-drawers have been only moderately employed, at prices, in most instances, anything but remunerative. The hollow-ware trade has been fairly steady. The tin-plate ware and japanned iron industries have been dull within a month or two. Galvanizers for the most part have been busy, more especially in the corrugated roofing sheet department. Business has been quiet in the engineering branch, but the demand for specialties has been well sustained. After a period of great depression, caused chiefly by foreign competition, the sheet-glass trade is at length reviving. Carriage iron-work is in steady and improving request. The metallic bedstead branch has been quiet than usual. The iron wood-screw trade continues to be affected by the keenness of competition. Silversmiths and electro-platers have found trade dull. In the steel pen trade, business on the whole has been satisfactory, though it is now flagging.

SOUTH WALES AND MONMOUTHSHIRE

furnish no news of any importance this week, everything being in a thoroughly lethargic state, the whole iron, &c., consignments having been but 540 tons. The tin-plate industry is busier, and full time is not unlikely to come into vogue early in the New Year. Prices remain steady.

## THE METAL MARKETS

have been quiet all around, owing to the season holidays.

Messrs. Von Dadelzen & North say: Copper has been quiet, with little doing. Chili bars, G. O. B., quoted £6. 10/- @ £6. 12/-; Wallaroo, £7. 5/- @ £7. 10/-; Burra, £7. 4/- @ £7. 10/-; English is steady. Tin has been quiet at £6. 0/- for Australian on the spot, with small sales thereof. Straits quoted £6. 6/-; English ingots, £7. 10/- @ £7. 20/-; Tin plates in fair demand. Lead has been dull; English pig, £1. 19/- @ £1. 19. 5/-; Soft Spanish without silver, £1. 18. 15/- @ £1. 18. 17/-; Spelter. No business reported; £1. 19/- @ £1. 19. 5/- for ordinary brands. Quicksilver steady at £7. 5/- for Spanish. Antimony unchanged; £5. 0/-.

To-day's metal exchange official prices are:

Copper unchanged; G. O. B. Chili bars £6. 10/- @ £6. 12/-; Wallaroo, £7. 5/- @ £7. 10/-; Burra, £7. 4/- @ £7. 10/-; English tough, £7. 10/- @ £7. 20/-; English ingots, £7. 10/- @ £7. 20/-; Tin plates £7. 6/- @ £7. 70/-; Tin quiet at £6. 6/- for both Straits and Australian; English ingots, £7. 10/- @ £7. 20/-; Scotch pig iron £1. 6/- cash. Lead quiet at £1. 19/- @ £1. 19. 5/- for English pig; soft Spanish, without silver, £1. 18. 17/-; Spelter, £1. 19/- @ £1. 19. 5/-; Quicksilver, £7. 5/- for Spanish. Antimony, £5. 1/-.

Messrs. French & Smith's report: Tin quiet; Straits and Australian, £6. 6/- Copper dull; Chili bars, £6. 10/- Lead. —No change.

The Mining Journal remarks: "The Christmas festivities are so generally appreciated in dear Old England that not even the usually grave and sober minded business man can remain wholly insensible to them, and the enlivening and elevating tendency of the convivialities render him perfectly indifferent to the downward tendency of markets.

If copper and tin are not quite so buoyant just now as would, perhaps, like them to be, there is no doubt in his pure imagination that they will come right in the end. As we cannot say much in praise of the old year, we refrain from speaking ill of the dying, and will merely remark that there is room for improvement in the ensuing one."

"Copper, quiet but steady; tin, moderately steady; iron, dull; spelter, unaltered; lead, unchanged; tin plates, as before."

At a sixth annual meeting on Friday last of the Russia Copper Company, it was shown that there had been loss of £12,273, on the year's trading as against £5,230, lost last year. The chairman, Mr. Brodgen, M. P. stated that part of the works had been burned down and that the company must now be liquidated.

## Scotch Pig Iron.

The following is the usual annual review of Messrs. James Watson & Co., of Glasgow: As usual at this season, we have pleasure in handing you our statistical statement of the Scotch pig iron trade for 1877. The depression of trade referred to in our last circular has not only continued, but increased, and has been aggravated by the disastrous war in the East and the unfortunate labor complications on the Clyde.

## WARRANT MARKET.

It will be observed that the market opened at its maximum, 57/10, and gradually declined until 53/6 was reached in March, the price for a few weeks afterward wavering between the latter figure and 54/9. As

a more hopeful feeling prevailed toward the end of April, accompanied by speculation, the price rapidly improved until 55/11 was attained on the 1st of May; thereafter a reaction set in and the market gradually drooped till 53/7 was accepted by the middle of June. At this time the iron masters directed their attention to a restriction of the production, and prices in consequence again improved until on the 14th August 55/7 was paid. Since that time there has been no animation, and the price has steadily receded to 51/6, at which we close to-day. The average price has been 54/4, as against 58/6 last year.

## PRODUCTION.

There have been produced during the year 982,000 tons by an average of 103 furnaces, showing the marked decrease on 1876 of 121,000 tons. The number of furnaces in blast at present is only 86, being rather more than half of the number built. This short production commenced about the beginning of August, and was resorted to on account of the men working irregularly, and the fear of demand for an advance of wages. The makers resolved to protect themselves by the policy they adopted and are still carrying out. Miners' wages have averaged about 4/3 per day.

# HOBART'S TACKS

MANUFACTURED BY

DUNBAR, HOBART &amp; WHIDDEN,

ESTABLISHED 1810.

Office and Salesroom, 116 Chambers Street, New York. - - - - - Factory, South Abington, Mass.

ROUND HEAD, COUNTERSUNK, AND CIGAR BOX  
NAILS.FRENCH WIRE NAILS, ESCUTCHEON PINS,  
MOULDING, PULLEY NAILS, &c.

With Round, Flat, and Fancy Heads.

Escutcheon Pins.

No. 18.

Brass Wire Nails.

No. 19.

6-8 7/8 in. 22  
7/8 " 21  
4-8 16 20  
5-8 14 20  
6-8 13 19  
7/8 " 15  
8-8 17  
9-8 16 16  
10-8 15  
11-8 14  
12-8 13  
13-8 12  
14-8 11  
15-8 10  
16-8 9  
17-8 8  
18-8 7  
19-8 6  
20-8 5  
21-8 4  
22-8 3  
23-8 2  
24-8 1

No. 16.

6-8 7/8 in. 22  
7/8 " 21  
4-8 16 20  
5-8 14 20  
6-8 13 19  
7/8 " 15  
8-8 17  
9-8 16 16  
10-8 15  
11-8 14  
12-8 13  
13-8 12  
14-8 11  
15-8 10  
16-8 9  
17-8 8  
18-8 7  
19-8 6  
20-8 5  
21-8 4  
22-8 3  
23-8 2  
24-8 1

Any Kind of Wire Nails made to order from Description, or Samples.

## American and Swedes Iron Tacks,

Tinned, Leathered and Large Head Carpet Tacks, Finishing Nails, Black and Tinned Trunk Nails, Miners' Copper, Gimp, Lace and Brush Tacks, Hungarian, Chair, Cigar Box and Barrel Nails, Glaziers' Points,

Iron, Steel, Copper and Zinc Shoe Nails, Patent Improved Brass Shoe Nails,

Heel and Toe Plates, Steel Shanks, and Fancy Head Nails, Silver or Japanned Lining and Saddle Nails,

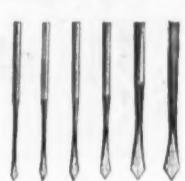
A full assortment always on hand at salesrooms, for immediate delivery if required. Odd and Irregular Sizes made to order or cut from sample at short notice. Send for Price List.



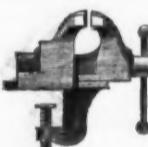
No. 1.



No. 2.



No. 3.



No. 4.



The demand for Bracket Saws and Materials has sprung up within the past three years, and it is now so large that many Hardwood Saws are being made. The goods are doing a lively business in that is usually the dullest season of the year. Our goods have been so thoroughly advertised that some of the best and most popular brands are now known in the United States. We believe there is not an instance where the demand has not steadily increased when once the goods have been introduced. In selling 200,000 Saw Frames we have not heard of one complaint, but where one is in use more are wanted.

We sell all kinds of Wood, Tools and Designs. The following are the retail prices of the articles shown in the surrounding cuts.

Dealers who order before sending for price list and discount sheet will in all cases get best rates.

## MILLERS FALLS CO., 74 Chambers St., New York.

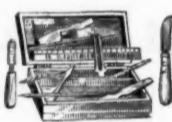
No. 1.—Lester Saw, embracing Scroll Saw, Circular Saw, Turning Lathe, Drilling Attachment, Set of Six Drills and Three Turning Tools, Wrench, Screw Driver, &c., &c.	\$8.00
No. 2.—Bow Drill, with Steel Saw, Frame, Three Sheets Designs, Six Saw Blades, Impression Paper, Awl, &c.	1.50
No. 3.—Set of Drill Points, in number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25.	.25
No. 4.—Steel Jaw Parallel Vice, 1/2 inch Jaw, \$6.00; 1 1/4 " 7.00.	2.25
No. 5.—Tool Holder containing twenty Cast Steel Tools.	1.00
No. 6.—Adjustable Chuck Hand Drill, with six Drill Points.	1.00
No. 7.—Set Best Steel Carving Tools in a Box.	.66
No. 8.—Bow Drill, with six Drill Points.	1.00
No. 9.—Tool Chest, with thirty-two Tools, No. 1, \$3.50; No. 2, with 18 Tools.	2.50
No. 10.—Saw Blades, 6 to 4 per gross, \$1.20; 4 to 7, per gross.	3.00



No. 7.



No. 8.



No. 9.



No. 10.

TENNIS & WILSON,  
SUCCESSIONS TO

J. CLARK WILSON &amp; CO.,

## Hardware Commission Merchants,

81 BEEKMAN STREET, NEW YORK.



SOLE AGENTS FOR THE

Snell Mfg. Co. and Davis Level &amp; Tool Co., Augers, Car Bits, Auger Bits,

Boring Machines, Iron Inclinometers, Plumb and Levels, Iron Planes.

We are closing out the remnant stock of the late J. CLARK WILSON &amp; CO. at great

bargains.

## STANDARD NUT CO.,

Pittsburgh, Pa.,

MANUFACTURERS OF

## HOT PRESSED

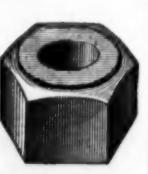
## Square &amp; Hexagon Nuts,

R. R. FISH BARS,

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NATIONAL  
Horse Nail Co.

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## FINISHED

[BRIGHT OR BLUED]



These nails are made of the best brands of NORWAY IRON, and are guaranteed to be equal to any in the market.

## NATIONAL HORSE NAIL CO.,

VERGENNES, VT

HORACE DURRIE &amp; CO., Agents,

No. 97 Chambers St., New York

A. F. PIKE,  
East Haverhill, New Hampshire,

Manufacturers and Wholesale Dealer in

Scythe, Axe, Knife and Hacking

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LETOILE,

UNION,

PREMIUM,

DIAMOND GRIT,

WHITE MOUNTAIN

INDIAN POND (red ends)

stones gotten up or labeled in

any style desired. Price and

quality guaranteed.

Our Stones are of good keen

grit and will not glaze.

C. G. NEWMAN,

Successor to Newman &amp; Capron, Manufacturer of

Carpenter's Tools, Car Bits, Auger Bits, Boring

Machinery, Gas Fitters' Tools, Millwrights' Tools,

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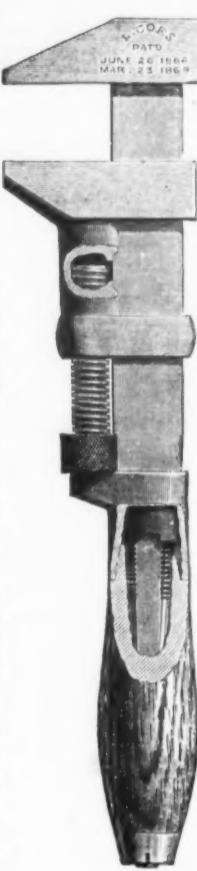
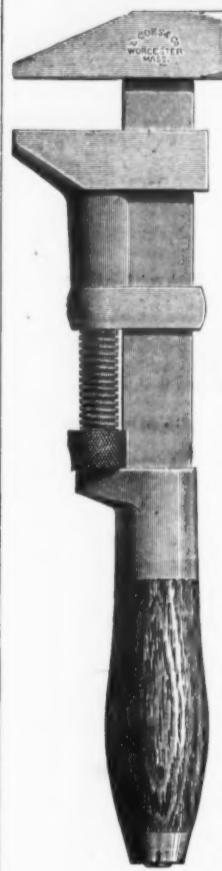
Works, 117 to 125 W. 25th St., New York.

## L. COES'

Genuine Improved Patent

## SCREW WRENCHES.

Manufactured by

L. COES & CO.,  
Worcester, Mass.

Established  
in 1839.  
Registered March 31, 1874.

We invite the particular attention of the trade to our New Straight Bar Wrench, widened, full size of the larger part of the so called "reinforced or log bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to any strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the fact, that in 1869 we made several important improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were at once closely imitated and sold as the "Genuine Wrench" by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade may not be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped.

"L. COES &amp; CO."

Warehouse, 97 Chambers St., & 81 Reade St., N. Y.  
HORACE DURRIE & CO., Sole Agents.

## MARTIN'S ENGLISH HORSE CLIPPERS.

J. J. Shannon

1707 Market St.,

PHILADELPHIA.

Recommended as the best Hand Clipper made.

\$5.00 each. Discount to trade.



Send for our illustrated price list and discounts.

JOB T. PUGH'S  
Celebrated AUGERS and BITS.

WARRANTED SUPERIOR TO ANY OTHER MAKE.

They are made entirely by hand, and are especially adapted to hard wood. Supplied to the trade only.

Gas Fitters', Millwrights', and Carpenters' Augers and Bits. Machine Bits of all descriptions made at short notice.

Office and Works,

Rear of Nos. 3112, 3114, 3116, 3118 &amp; 3120 Market Street, Philadelphia, Pa.

Heinz, Pierce &amp; Munschauer

Buffalo, N. Y., Manufacturers.

We have perfected our "GEM" Coal Hod for the trade of 1877

and can now recommend it to our customers as an article

that will supply a want long felt, viz: A Coal Hod that will not

spill the coal which is emitted either on a grate fire or in any

kind of stove. Our "GEM" Coal Hod will revolutionize this

respect, having a "free" and "easy" discharge of the coal.

They are made in five sizes, Jumbo, Bronze Band, Galvanized,

15 inches, per dozen. \$2.50. Bronze Band. Galvanized.

16 " " 2.50. 6.00. 6.00

17 " " 2.75. 5.50. 7.25

18 " " 3.00. 6.25. 8.00

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NET PRICES.

Special discount made for quantities on application.

The following houses are Agents for us:

HAMILTON &amp; MATHEWS, Rochester, N. Y.; McCARTHY &amp; REEDFIELD,

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Burlington, Iowa; JOSEPH SCHREIBER &amp; CO., 59 BEEKMAN Street, New York.

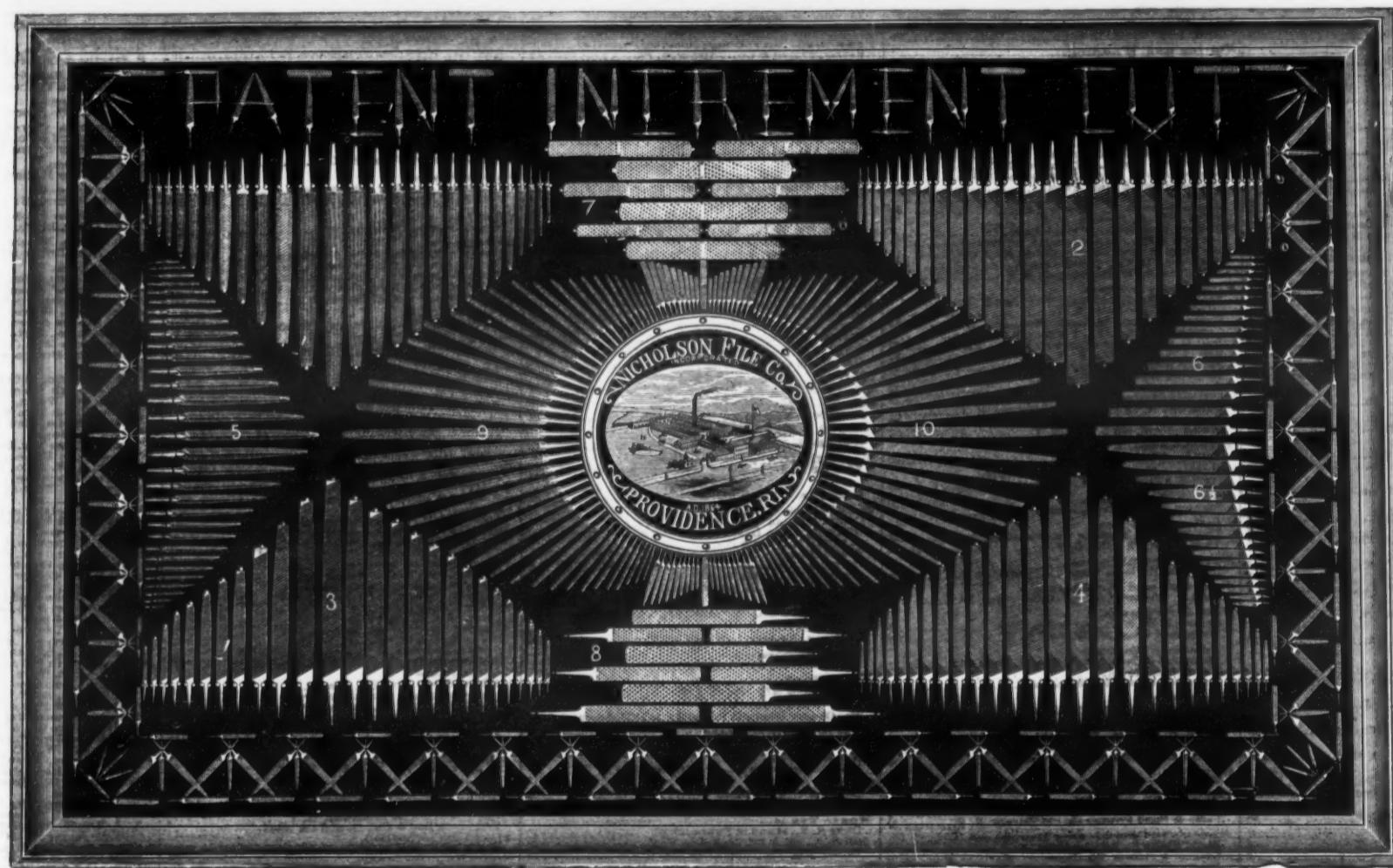


## The Iron Age Directory

and Index to Advertisements.

PAGE.	
1	<b>Architectural Implements.</b> Hubbard, H. N., 33 E. 2d, N. Y. 26
2	<b>Air Compressors.</b> Clayton James, 11 Water, Brooklyn, N. Y. 8
3	<b>Alarm Money Drawers.</b> Hoosfield A., 24 Dey, N. Y. 24
4	<b>Alarm Whistles and Speaking Tubes.</b> Ostrander W. R., 19 N. Y. 6
5	<b>Avails, Manufacturers of.</b> Finnis Morris, 11 Water, Brooklyn, N. Y. 28
6	<b>Apple Parers.</b> Appleton Brothers, 108 Chambers, N. Y. 33
7	<b>Armor Plates.</b> Moorehead & Co., Pittsburgh, Pa. 4
8	<b>Axle Edge Tools, &amp;c., Manufacturers of.</b> D. M. & Co., 108 Chambers, N. Y. 18
9	<b>Axle Springs, etc., Manufacturers of.</b> Brown D. Arthur & Co., Fisherville, N. H. 40
10	<b>Bed Screws, Maker of.</b> Shelton Co., Birmingham, Conn. 40
11	<b>Bellows, Manufacturers of.</b> Metzger Bros., 28 Water, N. Y. 26
12	<b>Belts (Sleight).</b> Belt Bros. Mfg. Co., Easthampton, Conn. 33
13	<b>Belting, Leather, Makers of.</b> Alexander Bros., 415 N. St., Phila. 28
14	<b>Bird Lances, Makers of.</b> Lindemann O. & Co., 242 Pearl, N. Y. 3
15	<b>Bit Braces, Manufacturers of.</b> Miller Bros. Mfg. Co., 74 Chambers, N. Y. 25
16	<b>Black Lead.</b> Moorhouse Bros., Philadelphia, Pa. 26
17	<b>Biscuit Tackles, Makers of.</b> Burke & Co., 31 Pearl St., N. Y. 26
18	<b>Boiler Tubes.</b> National Boiler Works Co., Boston, Mass. 26
19	<b>Bombs.</b> Ober Peter C. & Co., Paterson, N. J. 5
20	<b>Blowers, Makers of.</b> Keystone Portable Forge Co., Philadelphia. 29
21	<b>Boilie (Screws).</b> Eastie Bolt Works, Philadelphia, Pa. 26
22	<b>Books.</b> Larson Bros. Buell, 97 Chambers, N. Y. 20
23	<b>Bronzes.</b> Colclough, Wm. T. & Co., 187 Pearl, N. Y. 6
24	<b>Bronze Works.</b> Pope Thomas & Co., 292 Pearl, N. Y. 6
25	<b>Bronze Works.</b> Trotter H. W., 221 Pearl, N. Y. 34
26	<b>Bronze, Manufacturers of.</b> J. R. Baker, Anti-Friction Metal Co., 40 Canal N. Y. 21
27	<b>Bronze Goods Mfg. Co., 100 Pearl, N. Y.</b>
28	<b>Bronze Goods Mfg. Co., 100 Pearl, N. Y.</b>
29	<b>Bronze Goods Mfg. Co., 100 Pearl, N. Y.</b>
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# NICHOLSON FILE COMPANY, Providence, R. I.



1.-Half Round.

3.-Mill.

5.-Triangular.

6½.-Knife.

8.-Tanged Rasps.

10.-Square.

2.-Hand.

4.-Flat.

6.-Pillar.

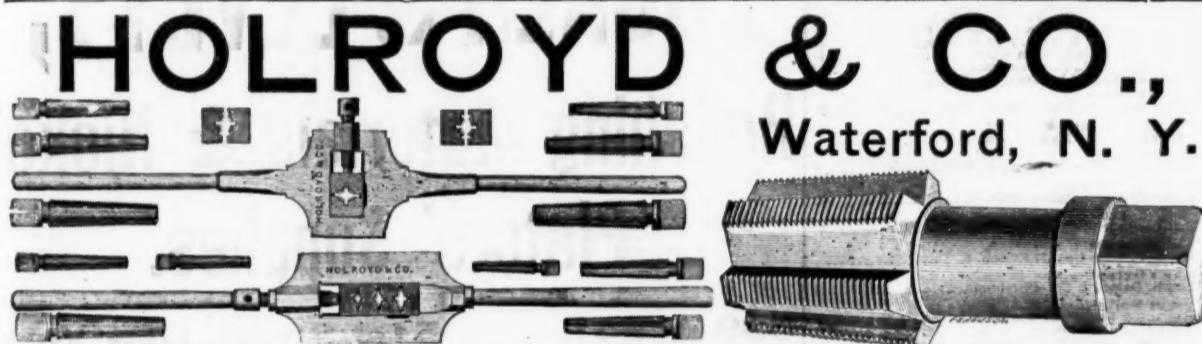
7.-Plain Rasps.

9.-Round.

11.-Borders.

In addition to above we manufacture **FILES AND RASPS** of every description and kind known to the trade. These goods are not excelled, and by a large proportion of both Consumers and Dealers are admitted as superior to any either of **Foreign or Domestic Manufacture**. We are constantly improving and adding to our machinery, and by carrying a stock of from 30,000 to 50,000 dozen Files on our shelves at all times, we are enabled to fill orders with the utmost dispatch, thereby saving both loss of **Trade** and **Interest** to our customers.

For several months past we have been engaged upon a **Catalogue** and **Treatise**, illustrative of the **File and its Uses**, which we hope soon to have ready for distribution. In this work we expect to introduce several new and important appliances connected with the uses of the File.



**THE AMERICAN MACHINE COMPANY, Philadelphia, Pa.**  
MANUFACTURERS OF  
**SPECIALTIES OF LIGHT IRON WORK.**



CROWN WRINGERS,  
with Patent White Rubber Rolls, Galvanized Malleable Iron Frame Work, Bessemer Steel Springs, &c. Noted for Strength, Durability, Efficiency and Simplicity.  
No. 2, Rolls 1½ in. diam., 10 in. long. No. 2½, Rolls 1¾ in. diam., 12 in. long.  
No. 3, Rolls 1½ in. diam., 12 in. long. No. 4, Rolls 2 in. diam., 12 in. long.



CROWN FLUTING MACHINES,  
with valuable improvements over other style Machines, Patent Spring Arrangement and Clamping Device. Noted for Superiority of Finish and Practical Advantages. The leading Machine in the market.  
Sizes (length of Rolls), 4½ inch, 6 inch and 8 inch.  
Rolls with 10, 12, 15, 18, 22, 26 and 30 flutes.

**THE EAGLE ANVIL !!**

(ESTABLISHED 1843.)



THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trades.)  
New York.—Messrs. TENNIS & WILSON.—RUSSELL & ERWIN MFG. CO.—Messrs. HORACE DURRIG & CO.—Mr. W. H. COLE, Louisville.—Messrs. W. B. BELKNAP & CO.—  
Boston.—Messrs. GEORGE H. GRAY & DANFORTH, Philadelphia.—Messrs. JAMES C. HANL & CO., Baltimore.—Mr. W. FISHER & NORRIS, Sole Manufacturers, Trenton, N.J.

**WARRANTED !!**

These Anvils are superior to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern) and from the quality of the materials employed.

The best English Anvils become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils is of crystallized iron, and no settling can ever occur; the face steel, therefore, remains perfectly true. Also, it has the great advantage, that, in case of a mallet, or other blow, it consequent with less rebound, the piece forged receives the full effect of the hammering instead of a part of it being wasted by the rebound, as of a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a hammer one-fifth lighter than that required when using a wrought iron anvil.

The working surface is in one piece of JESUP'S BEST TOOL CAST STEEL, which being accurately ground, is hardened and given the proper temper for the heaviest work. The horn is covered with and its extremity made entirely of steel. The body of the Anvil is of the strongest grade of American iron, to which the cast face is warranted to be thoroughly welded and not to come off.

Price, £100.00 per lb., 1876. ANVILS weighing 100 lbs. to 900 lbs., £c. per lb.

Smaller Anvils, £c. Minima, 0 0 1 2 3 4 5 1 7 8 9  
No. 00 0 0 1 2 3 4 5 1 7 8 9  
10 lb. 15 lb. 20 lb. 30 lb. 40 lb. 50 lb. 60 lb. 70 lb. 80 lb. 90 lb.

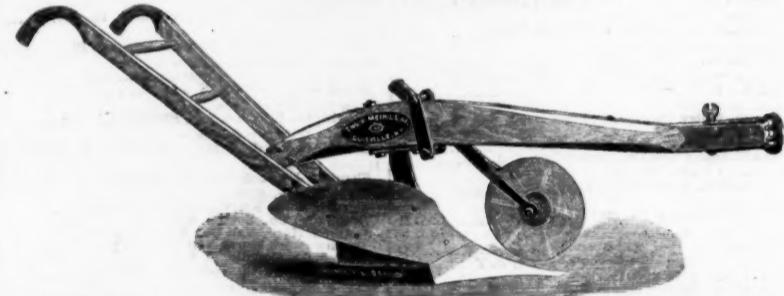
Weighting about 5 lb. 10 lb. 15 lb. 20 lb. 30 lb. 40 lb. 50 lb. 60 lb. 70 lb. 80 lb. 90 lb.

N.B.—These are the RETAIL PRICES. The only additional cost will be the freight to the purchaser's place of residence.

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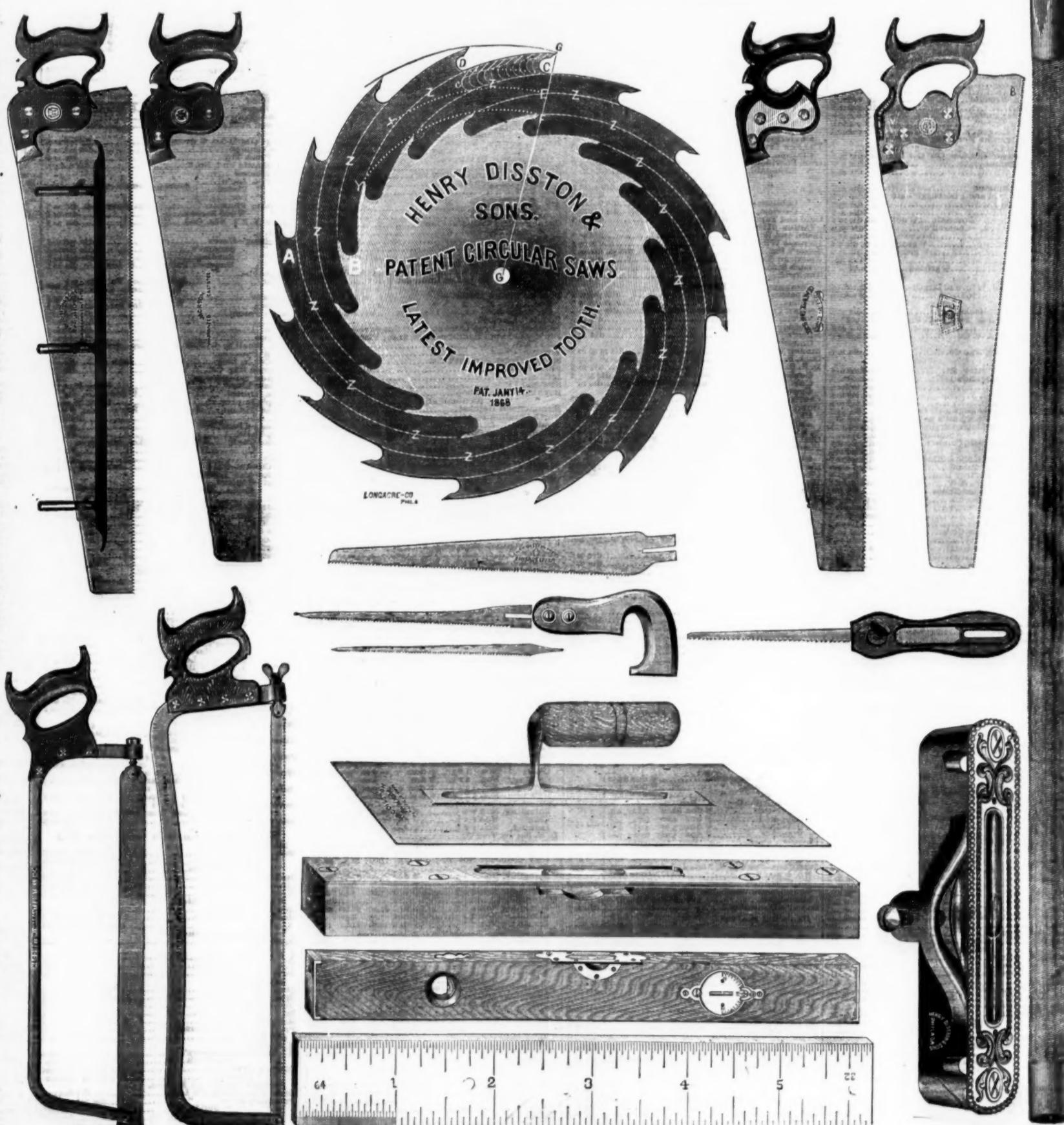
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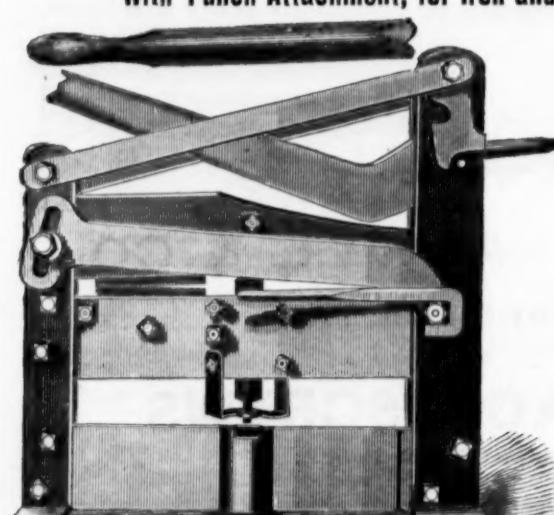
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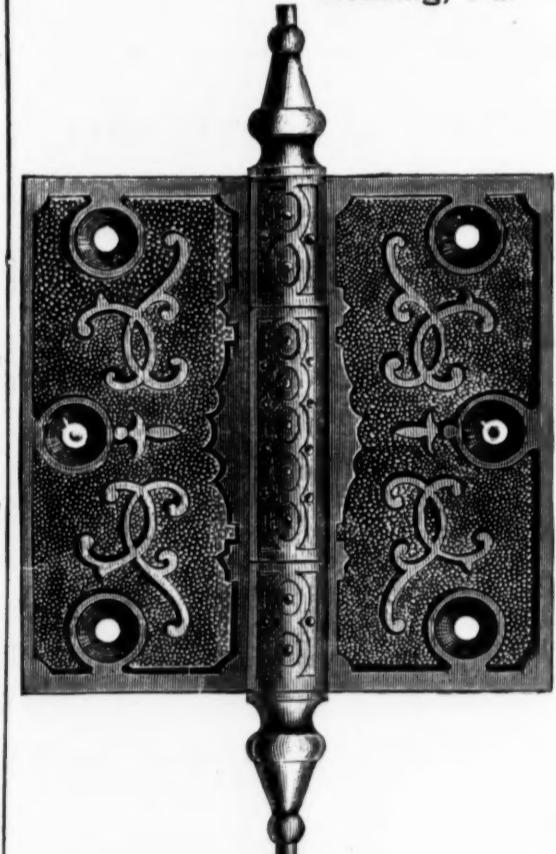
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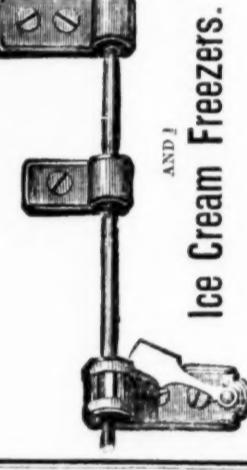
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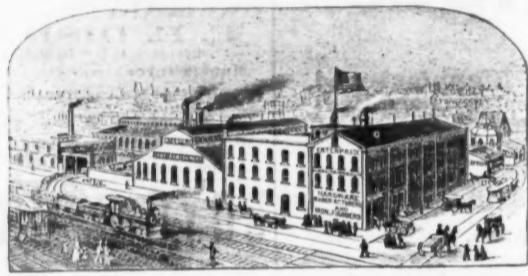


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American Coffee, Spice and Drug  
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Only Irons Filled  
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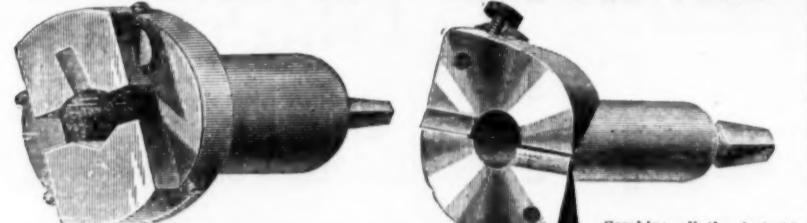
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Made from Malleable Iron. This Auger is light and  
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Our goods have been very  
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shown in the cut, which makes  
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15 in. made in the ordinary way,  
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NEW PATENT

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Which cannot be forced back  
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Our goods are manufactured  
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Nut (shown in section in the above  
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Manufacturers of Copper, Brass, and Iron Rivets; Common and  
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Stearns' Hollow Augers

and Saw Vises

Bonney's Spoke Trimmers

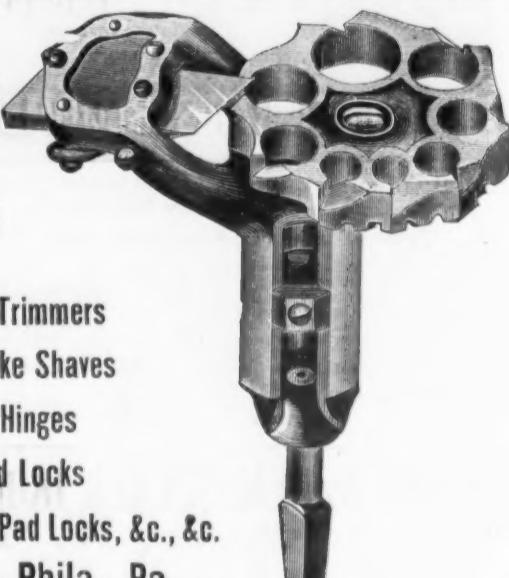
Double Edge Spoke Shaves

Adjustable Gate Hinges

Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &amp;c., &amp;c.

625 Market St., Phila., Pa.



## "FELTER'S PATENT LOCKS,"

MANUFACTURED BY

## The American Lock Mfg. Co.,

Are the most SECURE and DURABLE ever made.

## SECURE

Because they have 40 Brass Tumblers, independent in their action, either one of which will prevent the lock from being opened unless brought to proper position by the Key.

## DURABLE

Because we use no Springs to break or get out of place.

THEY HAVE  
STERLING METAL KEYSThat will not corrode or wear, and are  
stronger than steel.

Upright Rim Dead Locks,  
Horizontal Rim Night Latches,  
Horizontal Rim Tubular Night Latches,  
Mortise Night Latches, Plain Fronts,  
Mortise Night Latches, Ornamental Bronze  
Fronts and Knobs,

Brass Chest, Box, Cupboard and  
Drawer Locks,

Solid Bronze Padlocks.

Illustrated Catalogue and  
Price List sent on application.  
All orders should be addressed  
to



UNION NUT CO., General Agents, 99 Chambers St., N. Y.

## SOMETHING NEW.

## BOLSTER SPRINGS

For Farm and Lumber Wagons.

Pulliam's Patent.

Made of the best steel, and warranted.  
Will fit wagons of any size.  
Are attached by four bolts through  
the bottom of the bed. Lift off the  
gear with the iron bolt.

Operates equally well whether  
on a loaded or empty wagon. Saves  
largely in wear and tear. Removes  
necessity of spring seat. Affords  
comfortable riding for from one per-  
son to a wagon load.

Price per set of four springs, \$6.50.  
Liberal margin to Wagon Manufactur-  
ers and Dealers. Correspondence  
solicited, and circulars furnished.

Semple &amp; Birge Mfg. Co.

ST. LOUIS.

Parkhurst &amp; Wilkinson,

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WM. H. HASKELL &amp; CO.,

Pawtucket, R. I.,

MANUFACTURERS OF

## COACH SCREWS

(With Gimlet Points),

ALL KINDS OF

Machine and Plow Bolts,

FORGED SET SCREWS,

AND

TAP BOLTS.



## PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee &amp; Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent, per annum.

## Anvils.

Peter Wright's, \$ 5, gold, over 250 lbs. \$ 10, gold, net.

Wright's, \$ 5, gold, 250 lbs. 5 cents per lb.—dis 25.

Eagle (American), 5 cents per lb.—dis 25.

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Reading No. 72, per doz, \$ 5 50 net.

" 75, " 5 25 net.

" 78, " 5 20 net.

" 80, " 5 15 net.

Pearl Papers, 100 net.

Lit to Favorite, corer and slicer, 7 50 net.

Lots of 10 to 25 dozen special price.

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Hates' New Angers, " 40 &amp; 10 50.

Cook's Angers, " 50 &amp; 10 50.

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Benjamin Pierce Anger Bits, " 49 50.

Griswold Anger Bits, " 60 50 &amp; 10 50.

Cook's, " 60 50 &amp; 10 50.

Jenner's, " 60 50 &amp; 10 50.

Gunner's Pat. Hol. Angers, Unit \$ 18 50 net.

Stearns' Pat. Hol. Angers, " 45 ".

All other String Balances, " 25.

Bell's Bros. Mfg. Co. Light Hand Bells, " 70 50 &amp; 75.

Brass Pattern Hand Bells, " 30 &amp; 50 &amp; 10.

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With augers, \$ 50; without augers, \$ 30 net.

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Bolts.—Eastern Carriage Bolts, " 75 &amp; 50 &amp; 10 50.

" 50 &amp; 10 50, each.

Screws, Wrought Shutter, " 50 &amp; 10 50.

Braces.—Barbers, " 40 &amp; 50.

Packets, " 50 &amp; 10 50.

Soothard, " 20 &amp; 10 50.

American Ball, " 20 &amp; 10 50.

Battens.—One Fast Joint, Narrow, " 60 &amp; 10 50.

Broad, " 60 &amp; 10 50.

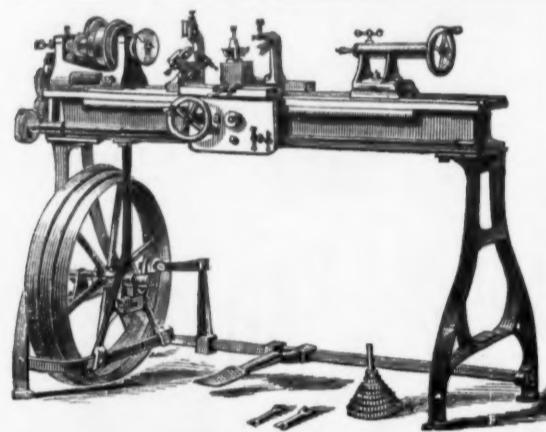
Cast Iron, Loose, " 60 &amp; 10 50.

" 60 &amp; 10 50, " 10 50.

" 60 &amp; 10 5

Chas. W. Ervien & Co.,  
IRELAND ST.  
Kensington, PHILADA  
BUILDERS OF  
STATIONARY & MARINE  
ENGINES, BOILERS  
SHAFTING, GEARING,  
AND  
MILL WORK  
GENERALLY.  
Special Machinery  
BUILT TO ORDER.

Vertical  
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Engines,  
Of New and Heavy De-  
signs, from 2 to  
100 H. P.,  
on hand or in process of  
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Israel H. Johnson, Jr.,  
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Tool & Machine Works  
Manufacturers of  
**LATHES**  
And their Attachments,  
of every variety, for Machinists,  
Brass Finishers, Wood Turners,  
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foot or steam power.  
Cylinders, Buffing Machines,  
Screw Machines, Turret Heads,  
Drop, Screw, Lever and Mandrel  
Presses, Screw and Eccentric  
Presses, Screw Cutters, Millers,  
Beamers, Taps, Dies, &c.; also  
Rotary Circulating Fans, Shafting  
Couplings, Hangers, Pulleys, &c.  
Dovetail Joints, &c. Send for  
New and Special Tools and Machinery.  
Illustrated Catalogue and Price  
List free on application.  
No. 440 North Twelfth St.,  
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Philadelphia, Pa.

**Keystone Pressure Blowers.**  
Maximum Blast and Minimum Power.  
All sizes for  
Forges, Foundries, Rolling Mills, &c  
ALSO  
**KEystone EXHAUST BLOWERS.**  
Made on same principle,  
For Ventilating Mines, Buildings, etc., Removing Dust,  
Shavings, etc., Dries Wood, Charcoal, etc. Every  
Blower Guaranteed. Send for circular, or  
call and see them in operation.  
**KEYSTONE PORTABLE FORGE CO.,**  
21st Carter Street, Philadelphia.  
Also, sole manufacturers of the celebrated **KEYSTONE PORTA-**  
**BLE FORGES**, for all classes of work, from the lightest to the heaviest.

**THORNE, DeHAVEN & CO., Drilling Machines,**  
21st Street, above Market, Philadelphia.  
PORTABLE DRILLS. Driven by power in any direction.  
RADIAL DRILLS. Self-feeding, Large Adjustable Box Table.  
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MULTIPLE DRILLS. 2 to 20 Spindles.  
HORIZONTAL BORING AND DRILLING MACHINES.  
HAND DRILLS. CAR BOX DRILLS.  
SPECIAL DRILLS. For Special Work.

**"Old Reliable" Direct Action Steam Pumps**  
For Use in Coal Collieries, Iron Mines, and Copper, Zinc,  
Lead and Salt Works.  
The Most Durable Steam Pump  
made.  
MANUFACTURED BY  
**GUILD & GARRISON,**  
34 First St., Brooklyn, E. D.  
Send for NEW PRICE LIST and TESTIMONIALS.

**YALE IRON WORKS,**  
New Haven, Conn.,  
Builders of the **YALE VERTICAL**, the best and most  
economical of other vertical machinery used; also  
HORIZONTALS, with or without the **YALE** Cut-off.  
RUBBER and PUNCHING PRESSES.  
**YALE VERTICAL MILL,**  
Iron Frame - French Bearer - Self-Feeding; Adjustable-Balanced; Long Bed - Cheapest, best arranged, best finished, and for quality and  
quantity ground no superior. Send for circular.

**STEAM ENGINES,**  
Vertical or Horizontal.  
Combined, as in cut, 2 to 12 H. P., or on independent beds, 2 H. P.  
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Yacht Engines and Steel Boilers, Shafting, Pulleys,  
Hangers, &c.  
Send for pamphlet, stating where you saw this, to  
**Fitchburg Steam Engine Co.,**  
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MANUFACTURERS & JOBBERS OF  
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LEAD PIPE & SHEET IRON,  
GAS PIPE FITTINGS,  
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L. M. Rumsey & Co.,  
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Snyder's Little Giant  
STEAM ENGINE.



FOR  
Farmers, Machinists, Printers,  
and all requiring light power.

SIZES FROM ONE TO SIX HORSE-POWER.  
PRICES FOR ENGINE AND BOILER,  
COMPLETE, FROM \$150 TO \$450  
WE ARE THE STRONGEST BOILER AND THE BEST  
ENGINE IN THE COUNTRY.  
Call at our factory and examine, or send for free  
Illustrated and Descriptive Catalogue.

**SNYDER BROS.**  
94 Fulton St., New York.

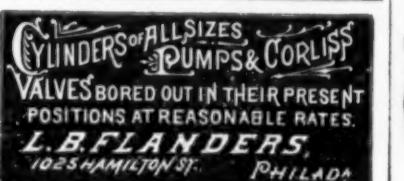


**American Hay Elevator**



The most perfect and simple, and the only elevator that raises the hay from wagon and carries it back in the barn any distance required. It can also be used in stores, &c. This elevator received the highest award at the Centennial field trial. Price \$12, with a 25% discount to the hardware trade.  
Manufactured by the Patentee.

**J. R. FITZHUGH,**  
1708 Barker St., Philadelphia.



**"TRENTON" RAPID TRANSIT VISES.**

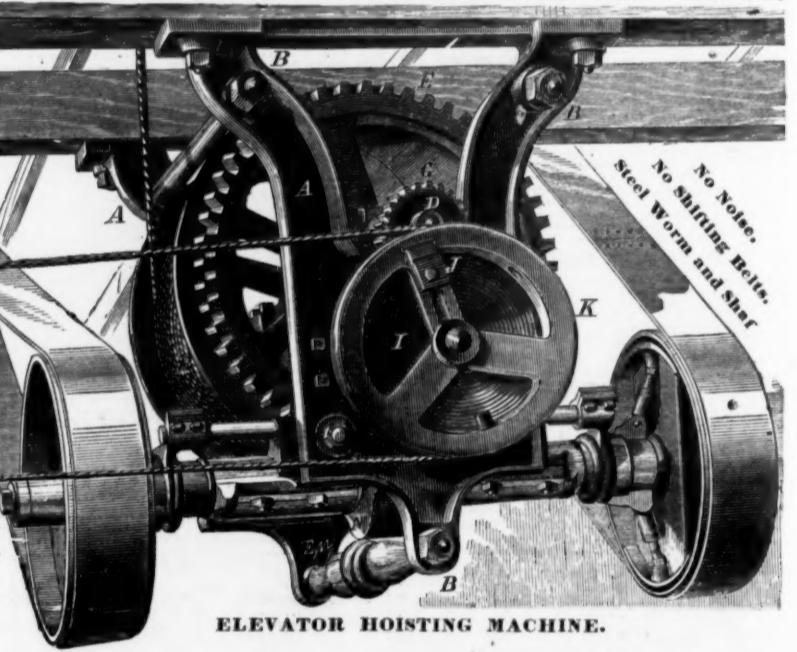
*Pat. Nov. 1st, 1870; Feb. 12th, 1877.*

**PARALLEL  
Swivel and Coachmakers'  
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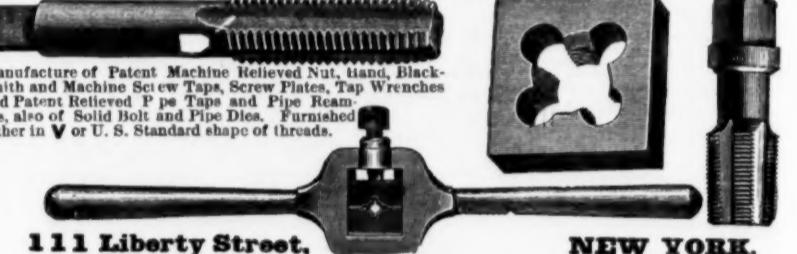
**The Best Rapid Adjustable Vise in  
the Market.**  
Simple and durable. No chance of  
getting out of order. No toggle or cam  
movements or parts. A trial will con-  
vince.

**MANUFACTURED BY THE  
TRENTON VISE & TOOL WORKS, Trenton, N. J.**  
Address orders to  
**HERMANN BOKER & CO., Proprietors,**  
101 & 103 Duane Street, NEW YORK.

**VOLNEY W. MASON & CO., Providence, R. I.**  
**Friction Pulleys, Clutches and Elevators.**



**H. S. MANNING & CO.,**  
Sole Sales Agents for **THE MORSE TWIST DRILL AND MACHINE CO.'S**



**GOLD MEDAL**  
**Non-Extensible Razor Belt.**

*PATENTED JULY 25, 1871.*

*RE-ISSUED MAY 13, 1873, and JUNE 9, 1874.*

In this strap the liability of the leather to stretch and become loose and porous is prevented by the use of a patented non-extensible base, which supports the leather and secures

**PERMANENT ELASTICITY.**

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

**BENJAMIN F. BADGER & SON, Manufacturers,**  
Badger Place, Charlestown, Mass.

**Ludlow Valve Mfg. Co.,**  
OFFICE AND WORKS:

938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.,

**VALVES**

(Double and Single Gate, 1/2 in. to 48 in. - outside and inside Screws, Indicator, &c. for Gas, Water and Steam.) Send for Circular.

**Also FIRE HYDRANTS.**

# OLIVERS' CHILLED PLOWS.



160,000

Plows now in use,  
GIVING

Perfect Satisfaction.

With new jointer and colter. The only perfect Plows. Every farmer should try them, and every dealer should know what they are. Do not waste money on poor tools. Get the genuine OLIVER. Look for the name on the beam. BEWARE OF INFRINGING IMITATIONS.

Manufactured only by

SOUTH BEND IRON WORKS, South Bend, Ind.

Branches at Mansfield, Ohio; Indianapolis, Ind.; Dallas, Tex.

## CLARK'S PATENT EXPANSIVE BITS

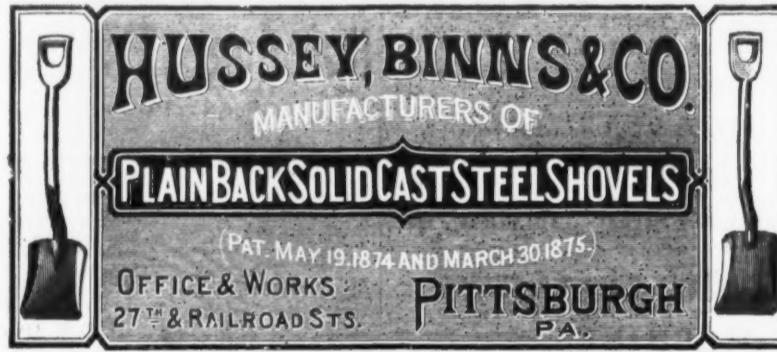
Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other

Two sizes: Large Size Boring,  $\frac{1}{2}$  to 3 inches; Small Size Boring,  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches.

Manufactured by

WILLIAM A. CLARK.

Westville, Conn.



PAT. MAY 19, 1874 AND MARCH 30, 1875.

OFFICE & WORKS  
27<sup>th</sup> & RAILROAD STS.PITTSBURGH  
PA.

### ESTABLISHED 1837. TOOL CHESTS.

These chests are made of chestnut, with real black walnut trimmings, and tools of superior quality. The range in price from \$7.00 to \$100.00 each, as follows, according to size and number of tools contained.

No.	12	13	14	15
Price, each.	\$7.00	\$5.00	\$3.75	\$3.00
No. of Tools.	35	28	24	20
No.	16	17	18	19
Price, each.	\$12.50	\$12.00	\$10.75	\$9.25
No. of Tools.	34	15	16	12
No.	20	21	22	23
Price, each.	\$1.00	75c	50c	35c
No. of Tools.	30	8	8	7

These Chests are made of heavy American Black Walnut, with tools of extra superior quality. They range in price from \$24.00 to \$100.00 according to size and number of tools contained, as follows:

No. 6. \$6.00  
Price, each. \$24.00 \$16.50 \$12.50 \$9.00 \$7.00 \$5.00

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## THE JUDSON GOVERNOR.

It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governor makers to the "Judson" are sold as being operating well enough or three months, to insure collection after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best *Steam Governor*, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

### Reduced Price List, FEBRUARY 1, 1877.

For dimensions of Governor, see Illustrated Price List.

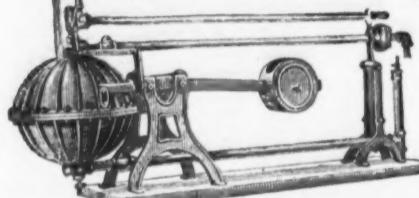


THE JUDSON PATENT  
Improved Steam Governor.

No Charge for Boxing & Cartage.

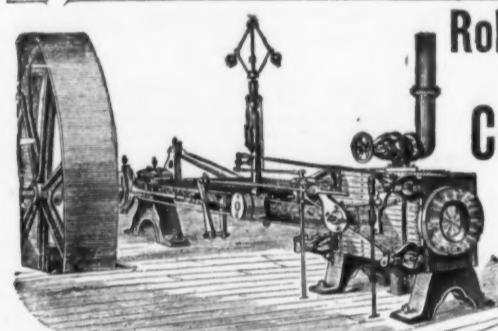
JUNIUS JUDSON & SON, Rochester, N. Y.

## The Albany Steam Trap.



This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler whether the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,  
Albany, N. Y.



Robt. Wetherill & Co  
CHESTER, PA.  
Corliss Engine  
BUILDERS,  
Shafting & Gearing.  
Boiler Makers.

## The Pratt & Whitney Co., Hartford, Conn.,

Have constantly on hand and making



## Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.

## The United States Automatic Stoker Co.

Is now prepared to erect

## AUTOMATIC STOKERS

(as shown in the British Section of the Centennial Exhibition, and for which the Medal and Award were given, and for which patents have been granted in the United States and in Britain, to DILLWYN SMITH), on favorable terms to manufacturers and all others using steam power. For prices, descriptive circulars, etc., address

**The United States Automatic Stoker Co.,**  
No. 2 Chestnut St., Philadelphia, Pa.

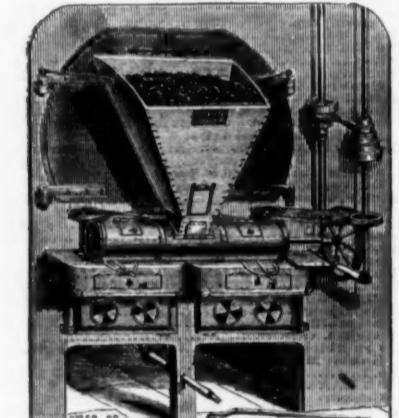
An increase of steam from 20 to 30 per cent. from a given grate surface, is the almost invariable result of the use of these stokers, and this is obtained from the use of the best sorts of coal in place of the larger sorts supplied by hand stokers. Our stokers are in use abroad. The following is selected from many recommendations:

From A. M. Collins, Son & Co.'s Factory, 3d and Canal Sts., Philadelphia.

April 3, 1877.

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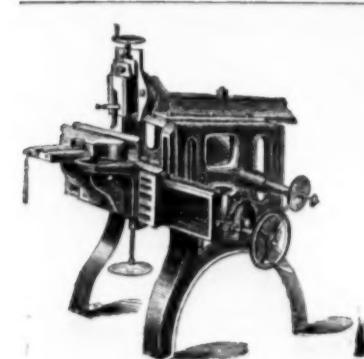


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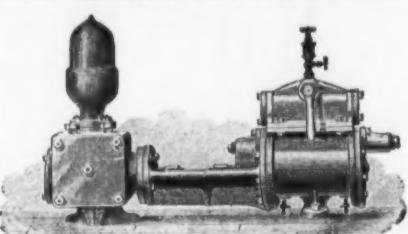
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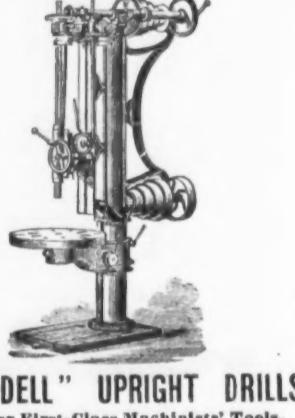
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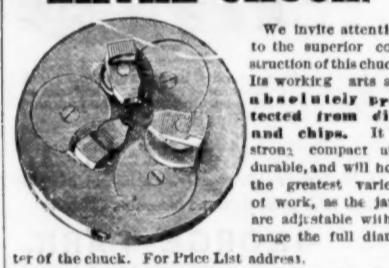
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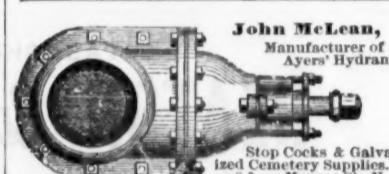
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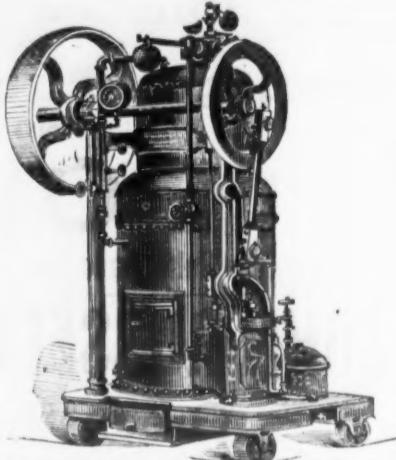
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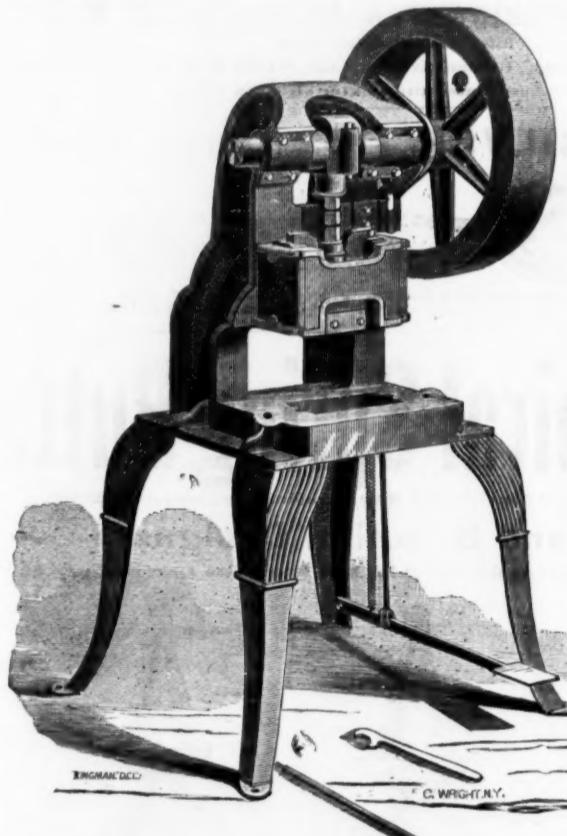
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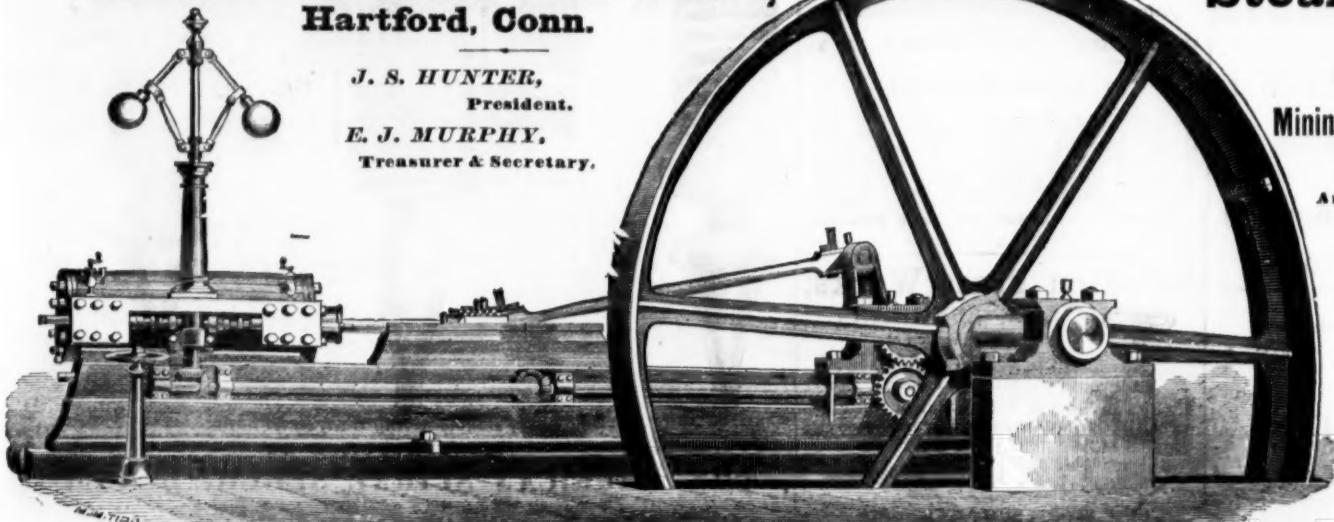
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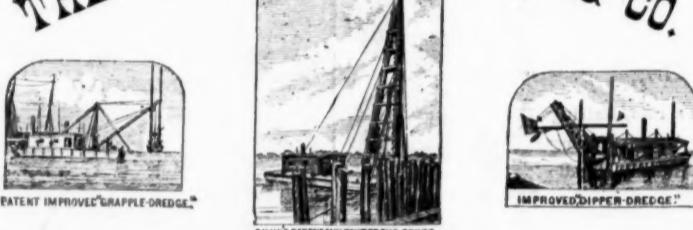
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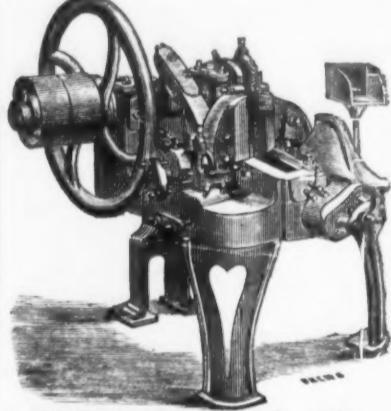
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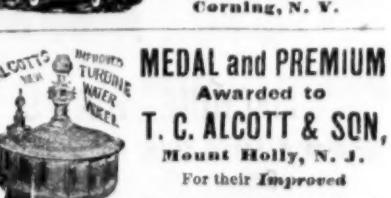
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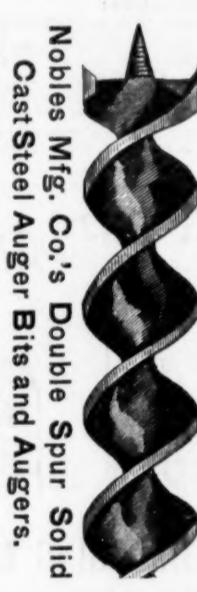
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